April 2020

Louisiana Beef Cattle Marketing Strategies

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LOUISIANA BEEF CATTLE MARKETING STRATEGIES

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Science

in

The School of Animal Sciences

by
Adam Barrilleaux
B.S., Louisiana State University, 2016
May 2020

Acknowledgements

While there are many people who I need to thank for their assistance with this project, it would take a long time to name all of them. Therefore, I specifically want to thank:

My major professor Dr. Tim Page whose assistance, guidance, and support made this work possible. It was at his urging that I undertook this project and he was there for me as both a mentor and a friend while I navigated this new program. My other major professor Dr. Christine Navarre stepped in when she was most needed and filled a big pair of shoes.

Dr. Kurt Guidry, my economics committee member, who provided valuable insight throughout the development of the program and helped truly make use of the information collected. Dr. Ken McMillin who became both a mentor and friend when I needed someone to talk to and helped correct my many mistakes. Without their knowledge, the project would not have been nearly as fruitful both practically and academically.

Mr. Michael and Dr. Maria Barrilleaux (my parents) who pushed me to set higher standards for myself and supported me when I didn't believe I could reach those standards. I am eternally grateful for their love and care throughout my life, and especially during this process. While I could never repay them for all they have done, I express my sincere gratitude.

Mr. Dave Foster, USDA cattle grading expert, provided his knowledge and expertise on cattle markets and compiled some of the most difficult data for the project. He was instrumental in the earliest foundations of the project and his experience helped

coordinate everything in a way that will be useful to cattle producers throughout the state.

Tony Bridges and his staff at the LSU AgCenter Central Station Beef Unit who allowed me to invade their day-to-day work and supplied the much-needed physical help and resources with all of cattle on the project. They were helpful and patient with all of the struggles along the way.

Finally, I thank my girlfriend Emily Halphen. Her support, encouragement, and understanding throughout my academic journey, and particularly during the research and writing of this thesis, made this all possible.

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Definitions

Yardage - the costs associated with keeping livestock confined not related to feed or medical care

Shrink - animal weight loss resulting from transportation

Pencil shrink - a predetermined shrink value to account for pricing with weight differences in cattle post shipment

Truckload - shipping unit of a two-decked trailer pulled by a semi-truck, the number of animals on the trailer is dependent on size and weight of animals

Abstract

The purpose of this study was to estimate the financial costs and returns of selected marketing strategies for cattle producers in the state of Louisiana. Cattle for the project were from the Louisiana State University Agricultural Center and commercial producers. Cattle were grouped by weight and sex and vaccinated, castrated, and handled using standard best management practices. The standard marketing practice for weaned calves in Louisiana of selling weaned animals at local stockyards was compared against alternative marketing of preconditioned calves through video auctions or after feedlot finishing. Feedlot cattle were sold both on live weight value and carcass weight on grid value. Cattle were graded by a recognized expert cattle grader to set a base value before they were sold or sent to the feedlot.

Final value of the animal minus base cost, preconditioning cost, and marketing costs of each strategy was compared to the initial animal value for reference. Data were analyzed to determine if certain weights, sexes, or feeder grades of animals affected returns depending on the marketing method.

Five-hundred and sixty-one weaned calves from LSU AgCenter Central Station, Hill Farm Research Station, and Louisiana cattle producers were utilized in various marketing outlets over 3 years. 389 animals sent to feedlots for retained ownership, 234 in 2016 and 155 in 2017. 124 heifers were selected for video auctions with 72 sold in 2017 and 52 in 2018. 42 heifers were sold in traditional auction outlets, with 14 sold as single animals and 28 sold in small groups. Returns based on frame scores were different ($P<0.05$). Large frame scores were the highest followed by medium and small frame scores, respectively. Final returns after marketing were different ($p<0.05$)

between all groups. Feedlot groups sold on a liveweight basis had the highest returns followed by feedlot animals sold on a grid basis, video auctions cattle, small group auction animals, and single auction animals, respectively. Results indicated that retained ownership through the feedlot and video auctions are profitable alternatives to conventional auction in our specific applications. Further research with more animals over a longer period is needed to validate this information.

Chapter 1. INTRODUCTION

There are various marketing strategies and outlets available to cow-calf producers for weaned calves (Figure 1.1). With modern technologies such as cell phones and high-speed Internet, many outlets have widely expanded and diversified.

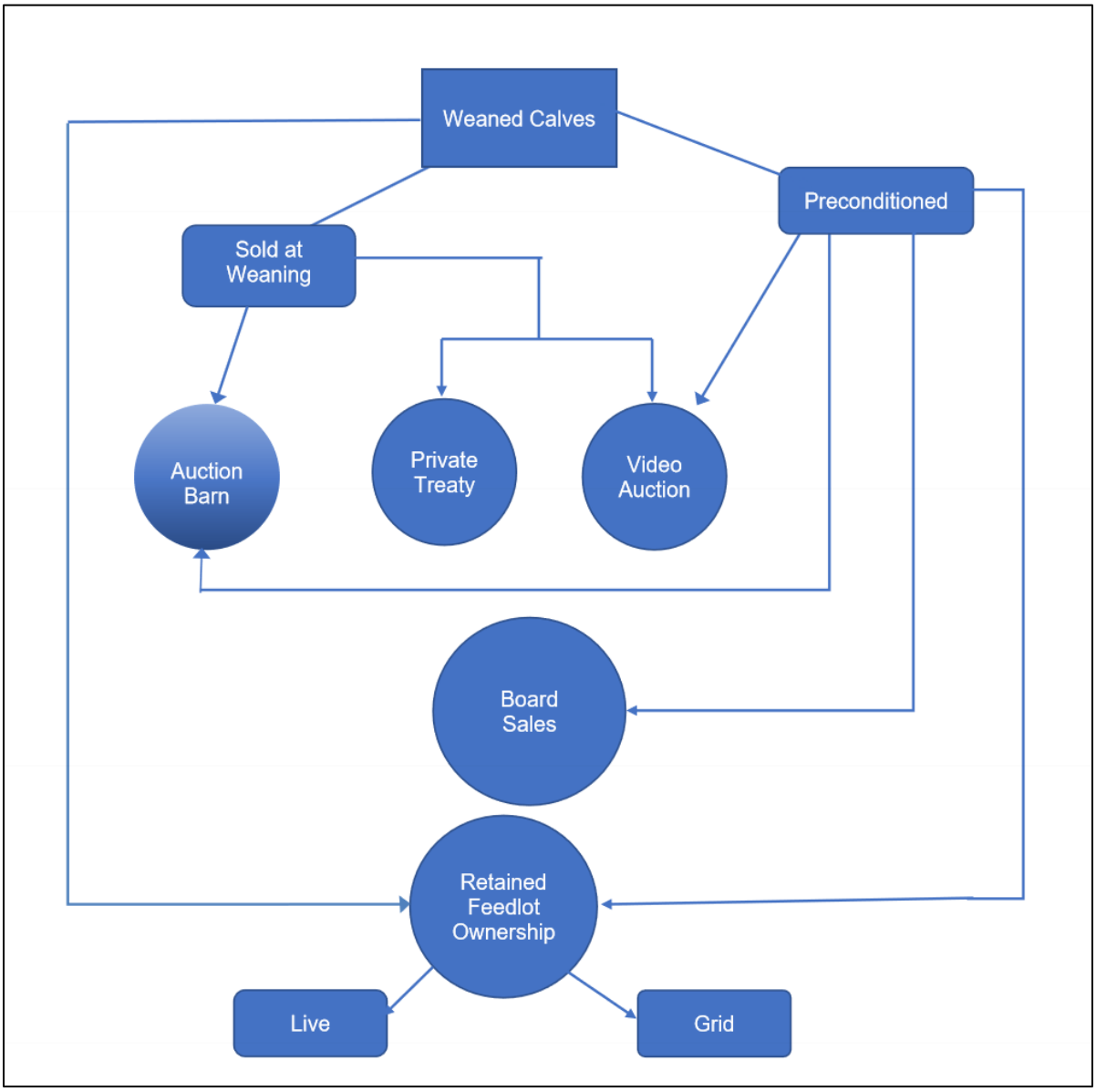

Figure 1.1. Common strategies and marketing outlets for weaned calves

Cattle producers are often reluctant to use new marketing methods due to unfamiliarity or concern with cost effectiveness. Sound information with definitive

financial results might convince producers to use some of these alternative methods. Producers would be able to learn requirements of these methods (lot size, vaccinations, preconditioning etc.), and the potential efficiency increases of each. This information may encourage producers to use these outlets and potentially work together and pool cattle in the event that one producer alone cannot meet animal numbers lot requirements.

Conventional auction is the most widely used outlet for cattle producers. Conventional auction is typically a weekly sale held in the same location where animals are sold one-by-one or in small groups and buyers bid on a per pound or per head basis to purchase the offered animals. Sellers are responsible for auction fees including a variable percentage of sale value commission, $1 per head Beef Checkoff fee, and yardage expenses where applicable. Sellers are also responsible for cattle transportation from the farm or ranch to the sale venue. The major benefits of this outlet are ease of use, familiarity, no lot size requirements, ability to sell all cattle types, including calves, cows, bulls, and cull animals, and same-day payment.

Video auctions are hosted via internet or satellite network and buyers view on-farm videos of cattle alongside information such as breed type, days weaned, and health program history. Superior Livestock Auctions claims to be the most widely used video auctions service and largest cattle network in North America (Superior Livestock Auction,2019). Buyers bid on cattle based on estimated live weight at the time of shipment. A price slide is used to protect both buyers and sellers in the event that the actual weight is not close to the predicted weight. Price slide is “a predetermined adjustment in the sale price of cattle and is included in the contract (forward contracting)

or in the description of the cattle (video or Internet marketing) being offered for sale based on the difference between the weight estimated prior to consignment or contracting and the actual pay weight" (Barham et al.,2019). Sellers are responsible for cost of any preconditioning, a 2 percent commission, a $2 per head consignment fee, and $1 per head Beef Checkoff Fee. Buyers incur all shipping expenses after the sale. Major benefits of this outlet are buyer numbers and competition, low transaction costs, and animals are able to stay on-site until after being sold so sellers do not incur shipping costs.

Retained ownership as it pertains to cow calf producers is defined as any period of holding calves longer than the standard practice of sale at weaning time. Most literature covers cow calf producers maintaining ownership of their calf crop through the feedlot until calves reach slaughter weights but retained ownership can also include backgrounding or stocker phases where weaned cattle are grown on lower-cost primarily forage diets. Sellers are responsible for costs associated with transporting animals to the feedlot as well as all expenses (feed, medicine, yardage, interest on deferred payment etc.) incurred by the cattle in the feedlot. Most feedlots will allow producers to defer costs until cattle are sold, with an interest expense on deferred payments for feedlot costs. Cattle are sold on a live weight basis, or they can be sold on a grid basis in which buyers pay on a carcass weight with premiums or discounts based on carcass characteristics. This outlet allows producers to add value to their calf crop by growing cattle to finish weights on grain concentrate diets at lower costs than the producer typically can, defer the time of marketing to take advantage of market cyclicality, and collect performance data on their animals.

1.1. Problem Statement

The most important factor for cattle producers to remain economically sustainable is profitability, which is the difference of gross income and total costs. Marketing avenues directly affect both portions of the profitability equation. Transaction costs associated with each market can be very different and are a producer-incurred expense. With nearly no control of the overall market prices that fluctuate and limited control of operating costs, cattle producers must examine marketing methods to increase revenue. In order for producers to make informed decisions about marketing avenues to increase efficiency, it is essential that they have access to information about the potential costs and returns of various marketing outlets. If producers have access to sound information about these outlets, they are more likely to be comfortable evaluating the risks and benefits of one of the alternative marketing outlets. Hopefully, this will help them to remain economically viable despite variable input costs and weaned calf prices. Insufficient access to information about other marketing options and reluctance to use new options appear to limit increased cattle marketing profitability

1.2. Objectives

The major goal of this study was to analyze the costs and potential profitability of specific marketing outlets for Louisiana cattle by cost-benefit comparison. Specific objectives were:

1) Determine if retained ownership provides a valuable marketing outlet for post-weaning calves
2) Determine which marketing methods might be suitable for producers based on herd size and other resources

This study focused on costs and returns of the various marketing strategies and outlets available to Louisiana cattle producers with preconditioned calves: (1) Conventional auction with cattle sold individually and in small groups (2) Video auctions (3) Retained ownership through the feedlot with cattle sold on live weight and grid bases. While the study focused on the state of Louisiana and its cattle, some pricing data from the states of Mississippi and Alabama was used because Louisiana does not have a state maintained record of animal sales or values and Mississippi and Alabama have comparable cattle environments and inventories.

Chapter 2. Literature Review

Literature on cattle markets in the state of Louisiana is limited and nearly all recent publications are from extension handouts and textbooks as opposed to peer-reviewed publications. Most of that research also provides the costs and efficiency of marketing outlets as opposed to actual returns based on individual animal values. It is rare to find research that actively compares multiple marketing outlets over one period, as most published studies simply compare one outlet to conventional auctions since conventional auction is by far the most widely used outlet in terms of number of producers using this outlet and the percentage of cattle sold through that outlet (Gillespie et al, 2004; McCullock, 2017).

2.1. Industry Review

Louisiana's cattle industry is an essential part of the agricultural sector as the second largest livestock industry in the state behind poultry. Cattle production in 2018 had a total value of over $413 million, 6.5% of the state's total agricultural and natural resource enterprises value, and 22.7% of the animal commodity value (LSU Ag Center, 2019). Due to this major economic impact on the state's agricultural production, the support of this industry is highly important not only for cattle producers, but for all related industries (feed, seed, fertilizer, etc.). The beef industry in Louisiana is primarily a cow-calf industry, with producers owning reproducing cowherds and selling offspring weighing less than 700 pounds at weaning or shortly afterwards (LSU Ag Center, 2019). The cattle industry, like many other agricultural industries, is prone to price cyclicality. Cattle prices reached all-time highs in 2015, followed by price drops in 2016 and 2017. During the higher price period, there was likely little concern for marketing outlet costs

or returns as nearly all markets gave excellent returns regardless of marketing costs. When prices decreased, producers who made production investments during the high price periods struggled to make payments on those investments. Even those producers who did not increase production still struggled to pay normal production costs with lower revenues. Reduced prices forced cattle producers to find alternative means to increase their revenue or decrease their costs. Producers are vulnerable to market prices and attendance of buyers at conventional auctions on any given day. As cattle producers strive to become more efficient and remain profitable, they must either reduce input costs or receive more money for the animals sold. Efficiency can be separated into pricing efficiency in which the goal is to efficiently allocate resources and create maximum economic output and operational efficiency where producers attempt to reduce marketing, transportation, and transaction costs without affecting their own production. Since input costs like fuel, fertilizer, herbicides, and equipment are less easily controlled by a producer, the logical option is for them to explore ways to reduce marketing costs or to add to the value of the cattle marketed.

Major disadvantages to Louisiana producers are that the state has no feedlots for finishing cattle to slaughter weights due to climate, the distance from the grain and feedlot centers of the U.S., and many cattle have some Brahman breeding due to the climate that reduces animal values (Hawkes et al., 2008). Much of the Southeastern U.S. suffers from lower prices on cattle comparable to regions where grain and feedlots are more prevalent. The Southeastern Region as a whole is one of the least profitable for cattle production, with North Central being the only region with lower returns after operating costs ($1.24 and $-23.75 per bred cow respectively), (Short, 2001). Sartwelle

et al. (2006) determined that regionalized production variability had a larger effect on profitability for ranches than the rising cost of inputs. This means that marketing options that require larger cattle numbers, such as group sales, are limited. Additionally, most of these options have substantial added trucking expense when compared to costs in those states with major feedlot and grain production areas. The added expense impacts those producers pursuing value-adding opportunities as well as the stockyard market prices for calves, since buyers have the expense of moving the cattle to feedlots.

Another disadvantage facing Louisiana producers is a small average herd size. The average 39 head herd size in Louisiana is just less than the national average of 43.5 head of beef cows per operation (NASS, 2018). This herd size, with an assumed proportionally equal crop of bull and heifer calves, means that the average Louisiana producer can have no more than 20 head of each sex to create a marketable group. Buyers in the calf market want truckload sized, uniform groups of around 60 head of 500-600 weight cattle. With an average herd size of less than 40, Louisiana producers would find it difficult to meet these demands. In addition to small average herd size 85.6 percent of all beef cattle operations in the state consist of herd sizes smaller than 50 cows (NASS, 2018). Assuming normal weaning percentages of 90%, marketing outlets may be limited due to producer inability to meet lot size requirements. Louisiana's cattle industry mirrors the rest of the Southeast with mostly smaller and/or part time operations when compared to the other regions of the U.S. (Short, 2001). A reasonable option for some producers is to group cattle with other nearby producers having a similar calf crop in order to meet lot size requirements. Grouping cattle may prove inconvenient, but the price benefit and/or the cost savings of these marketing options

may justify the inconvenience of pooling cattle. Even if the desired outlet does not innately offer higher prices, pooling cattle can help achieve larger uniform group size, attracting more potential buyers. Additionally, pooling cattle can help dilute marketing and trucking costs among producers.

Due to the aforementioned factors related to Louisiana's cattle inventory and industry as well as certain personal factors of producer comfort using alternative marketing outlets, most Louisiana producers still choose to sell cattle at the local auction barn (Gillespie et al., 2004).

Another issue affecting all aspects of the beef market is cyclicality of prices and inventories. Cattle inventory, prices, and marketing methods have high and low periods in cycles both within the year and more drastically over a period of years. Because of these cycles, producers can have difficulty making efficient marketing decisions in any given year and an even greater difficulty making any long-term production decisions such as when to alter their inventory and what marketing strategies to use in their next production cycles. General market trends and cycles are not exclusive to Louisiana (Figure 2.1). Profitability per animal plummeted after record high prices in 2014 and 2015, and is expected to trend downward in the coming years, with average-return producers losing money on a per animal basis by 2020 (Hughes, 2018). While cattle prices are highly variable from year to year, inventory is not as variable because production capability is difficult to increase in the short term (Figure 2.2).

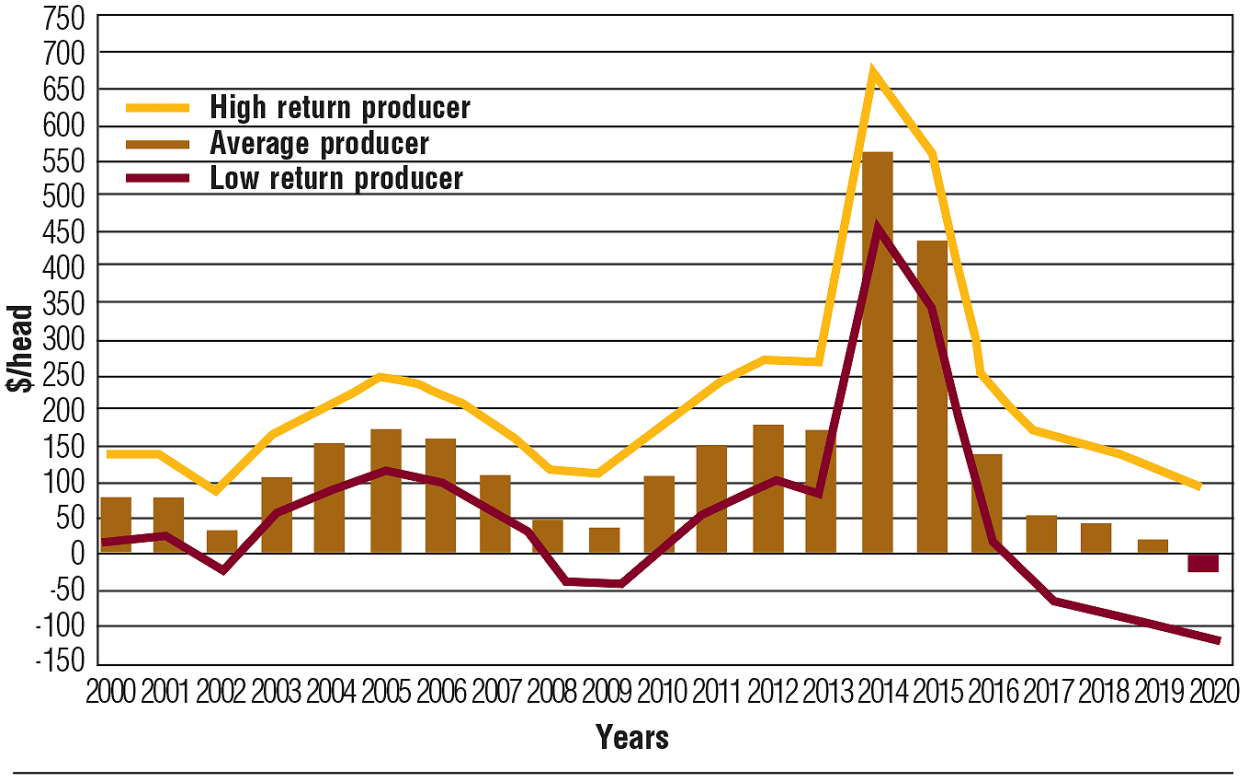

Figure 2.1. Cow-calf profitability (Hughes, 2018).

In order for beef producers to increase the amounts of product sold (weaned calves), they must increase the cow inventory, and wait through gestation and weaning periods for these cows to produce a marketable product. This process can take two or more years depending on whether the producer chooses to raise and develop his own replacement females or purchase breeding age cows. Also, due to the price fluctuations, producers may have financial constraints from previous years making them unable to increase their cowherd inventory. Due to the unpredictable variability of prices (Figure 2.3) and difficulty in determining future stages in the price cycle, producers have distinct challenges determining when to purchase or raise more cows to produce a larger calf inventory.

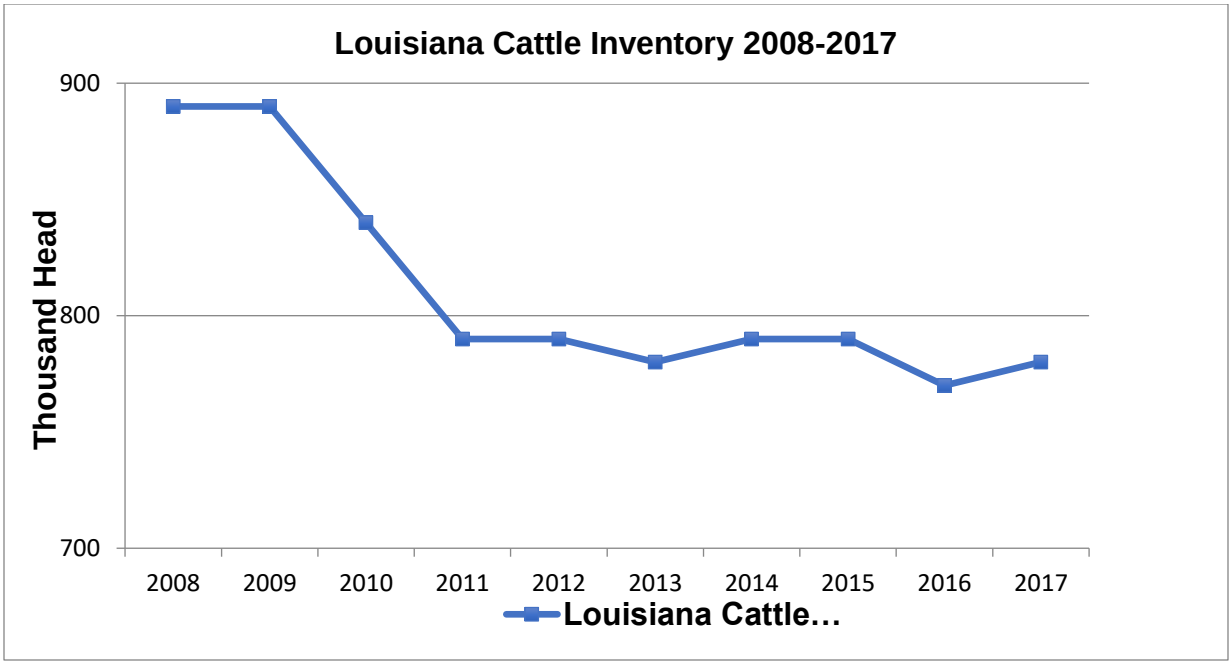

Figure 2.2. Louisiana cattle inventory 2008-2017 (NASS, 2018)

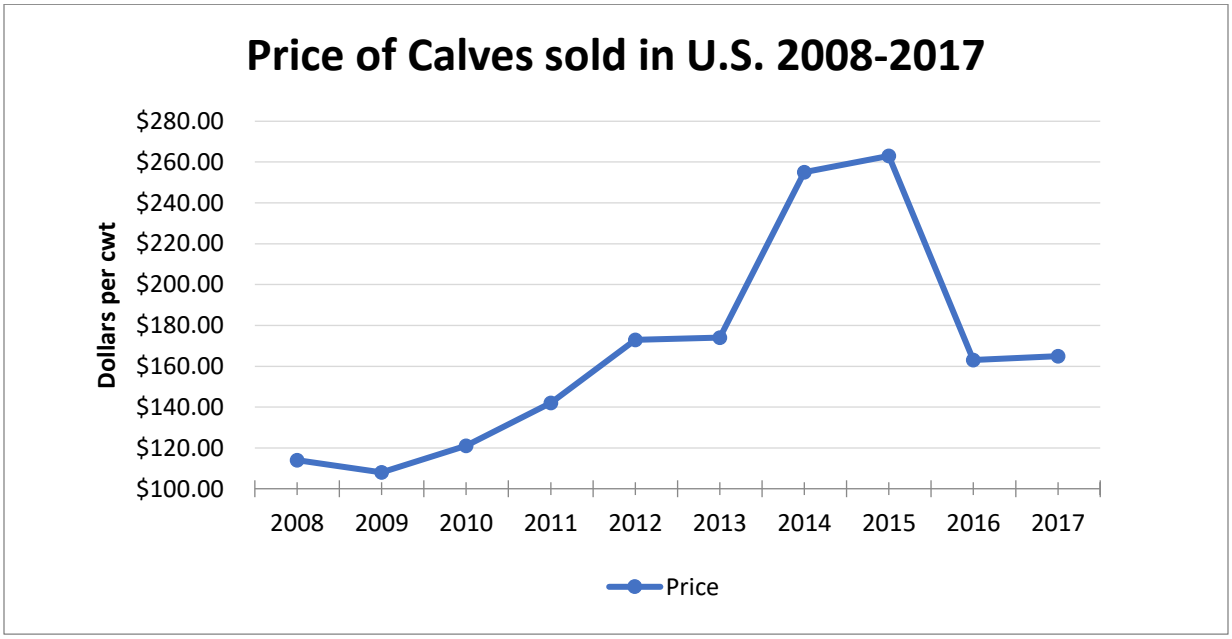

Figure 2.3. Average calf prices for the U.S. 2008-2017 (NASS, 2018)

Income (Figure 2.4) comparative to cost is a major deciding factor for whether a cattle producer will alter the production system by investing in more land, breeding cattle, or new technologies and equipment. Unpredictability and variability of income

introduces risk from year to year and makes any production alteration decisions extremely difficult for producers.

Income variability illustrates the importance of producers to maximize efficiency through selection of the best marketing outlet. By reducing marketing costs, producers are able to diminish the impact of price variability in poor market periods or are able to maximize returns during better market periods.

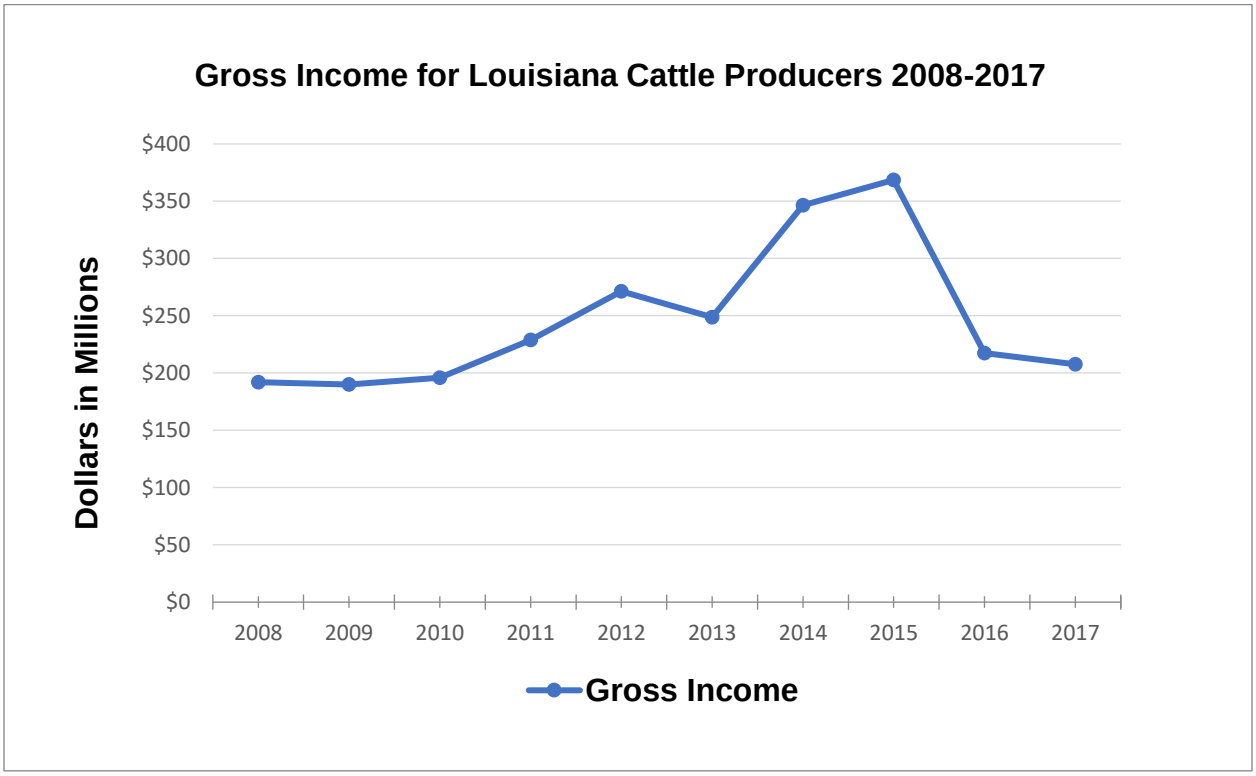

Figure 2. 4. Gross income for Louisiana cattle producers 2008-2017 (NASS, 2018)

2.2. Feeder Grades

Feeder grades are subjective evaluations of the animal's phenotypic appearance with intent to predict the genotypic performance of individual animals. According to Duggin and Stewart (2017) feeder grades facilitate transparent communications about animal values between producers and other segments of the beef industry and help producers understand feeder cattle pricing. Feeder grades are USDA standard frame

and thickness scores assigned to cattle as a method of determining approximate finishing weights or sizes in in a feedlot (Karisch, 2014). They offer Frame size measured as small, medium, or large is an expectation of an animal's growth based on skeletal size relative to its maturity and thickness is determined by gauging the animal's musculature relative to the skeletal system and is measured numerically (AMS, 2000). Table 2.1 shows the standard frame size grades based on expected weights of cattle that would grade choice with approximately ½ inch of backfat.

Table 2. 1. Expected live market weight of choice grade cattle for different feeder cattle frame sizes (Agricultural Marketing Service 2000)

Frame Size	Steers	Heifers
Large	1250	1150
Medium	1100	1000
Small	<1100	<1000

According to the standards set by the USDA Agricultural Marketing Service, thickness grades are denominated numerically 1-4 with the following criteria:

"No. 1. Feeder cattle which possess minimum qualifications for this grade usually display predominate beef breeding. They must be thrifty and moderately thick throughout. They are moderately thick and full in the forearm and gaskin, showing a rounded appearance through the back and loin with moderate width between the legs, both front and rear. Cattle show this thickness with a slightly thin covering of fat; however, cattle eligible for this grade may carry varying degrees of fat.

No. 2. Feeder cattle which possess minimum qualifications for this grade usually show a high proportion of beef breeding and slight dairy breeding may be detected. They must be thrifty and tend to be slightly thick throughout. They tend to be slightly thick and full in the forearm and gaskin, showing a rounded appearance through the back and loin with slight width between the legs, both front and rear. Cattle show this thickness with a slightly thin covering of fat; however, cattle eligible for this grade may carry varying degrees of fat.

No. 3. Feeder cattle which possess minimum qualifications for this grade are thrifty and thin through the forequarter and the middle part of the rounds. The forearm and gaskin are thin and the back and loin have a sunken appearance. The legs are set close together, both front and rear. Cattle show this narrowness with a slightly thin covering of fat; however, cattle eligible for this grade may carry varying degrees of fat.

No. 4. Feeder cattle included in this grade are thrifty animals which have less thickness than the minimum requirements specified for the No.3 grade"

Agricultural Marketing Service (2000)

There is also an "Inferior" cattle grade applied to cattle that do not appear to be thrifty and are not expected to perform normally due to illness, genetics, or nutrition in addition to double muscled cattle due to their proclivity to grade poorly. "Inferior" cattle may be any thickness or frame size.

2.3. Feeder Cattle Prices

Price determination for feeder cattle is a complex process impacted by a large number of factors and nearly innumerable interactions of these factors. Physical traits such as weight, sex, frame score, grade, breed-type, and hide color affect prices most prominently (Smith et. al. 1998 Barham and Troxel, 2007; Schulz et. al 2009). Furthermore, indirect or non-animal factors like region, climate, grain prices, fed cattle prices and commodity futures can also have effects on prices.

2.4. Value of Preconditioning

Preconditioning calves involves weaning, vaccination, and nutritional protocols designed to prepare the animals for the next phase of production and add value (Hightower, 2019). Although it is not a marketing strategy in and of itself, it is a very important component in many marketing strategies. While preconditioning programs can vary among producers, the basic goals of reducing weaning stress, preparing the

immune system, adding weight, and adjusting the rumen from forage to a grain-based diet are universal. Preconditioning can be an effective component of alternative marketing programs for a producer by adding value to the animals because this adaptation occurs prior to the animal being sent to the feedlot. Preconditioning does not necessarily require the animals to be moved before sale, but it does create added expense in the form of added time, feed, and labor. In order for preconditioning to receive the appropriate value relative to input costs, besides addressing the universal goals, the producer must find a marketing avenue that will designate the calves as preconditioned. Producers may also see benefit of preconditioning on calves with the intended purpose to retain ownership either through the stocker or feedlot phases.

The ideal preconditioning period is at least 45 days in order to produce beneficial weight gains, complete immunizations, and allow calves to fully recover from weaning stress (Thrift and Thrift, 2011). These practices before the calves are moved to their next production phase help to increase performance and reduce morbidity and mortality in the finishing phases. Typical cost of preconditioning is around $60-75 per head depending on the specifics of the protocol (Dhuyvetter et al, 2005; Brooks and Eirich, 2014). Preconditioning costs can vary based on vaccination protocols, labor, and the type of nutrition provided to the cattle. Economic benefits for producers intending to sell calves immediately after preconditioning are either from added weight or sale premiums. Some of the positive effects of weight gain will be countered by the lower prices that might be received for heavier weight calves. While preconditioning is shown to add weight and improve the health and performance of calves, this practice does not mean a net profit for the producer (Thrift and Thrift, 2011).

Various researchers have shown that buyers of feeder cattle typically give a premium for preconditioned cattle compared to calves not preconditioned or minimally preconditioned (Ward and Lalman, 2003; Avent et al., 2004; Dhuyvetter et al., 2005; Thrift and Thrift, 2011; Abrahamsen et al., 2017). The concept of premiums in these studies refers to increased unitary values (per lb. or per cwt.) of preconditioned animals versus comparable animals that were not preconditioned. It does not typically refer to gross or net value per animal It is important to note that if cattle producers do not use avenues that designate calves as preconditioned and/or describe the preconditioning process used, they may not receive premiums for those calves. Producers are reluctant to adopt preconditioning as a practice despite its obvious benefits for the cattle because returns are questionable. Calves sold in a traditional single animal auction are unlikely to see per pound price premiums although there should be added value from heavier weights. Weight gain alone may not be sufficient to cover costs associated with preconditioning, and in these cases producers must also earn a premium for preconditioned animals at sale time (Parish et al., 2017). When calves are in special sales for preconditioned calves or sales with both preconditioned and non-preconditioned calves where preconditioning status is designated, they may receive a price premium in addition to increased animal value associated with weight gain. The added cost and labor combined with the uncertainty of returns has made many producers reluctant to adopt preconditioning. In a study of value-added programs for video auctions from 1995-2005, premiums ranged from $0.99/cwt to $3.47/cwt for a 34-day weaned program versus $2.47/cwt to $7.91/cwt for a 45-day weaned program on preconditioned calves compared with similar calves not in certified programs (King et

al., 2006). Research from 2012-2016 in Alabama showed returns between $21 and $32/cwt for preconditioned calves depending on animal weight (Abrahamsen et al., 2017). While the aforementioned studies both showed positive returns for preconditioning, they analyzed a specific sale type instead of comparing preconditioned animals against non-preconditioned in normal single-animal auctions. Price premiums of $3.30/cwt and $1.94/cwt were reported on two types of preconditioned calves compared to regular Joplin Regional Stockyards auction prices with the lower premiums possibly resulting from variations in vaccination and weaning guidelines (Avent et al., 2004). Thrift and Thrift (2011) reported premiums ranging from $1.43 to $6.15/cwt with net profits ranging from -$89.92 to $53.71/calf in their review of preconditioning research. A review on the economics of preconditioning reported a baseline breakeven premium for a generic 45-day preconditioning protocol at $1.82/cwt (Dhuyvetter, 2005). Lalman and Mourer (2014) estimated breakeven prices ranging from $154.53 to $164.83/cwt for various 45-day preconditioning protocols depending on the specifics of the nutrition program used, with feed cost being the largest portion of expense in all scenarios. Dhuyvetter (2005) noted that when requirements were met for such a protocol (assuming certain baseline costs and average daily gain (ADG of calves), buyers of calves marketed in specialty outlets were willing and justified in paying premiums that would cover the costs of preconditioning and net small returns for cow-calf operators.

A major influence for producers who normally sell cattle at weaning considering preconditioning is cost of gain. Cost of gain (COG) is the marginal cost of each pound of weight gain during the preconditioning program. This is determined by dividing total costs by total pounds gained. COG will be determined by the inputs a producer chooses

or needs during a preconditioning period as well as the performance or weight gain of the animals, so producers must consider these factors carefully. COG can be compared against value of gain (VOG) using the following formula ((Future value-current value)/ (future weight- current weight)) to determine whether preconditioning will be a profitable. Similar calculations can be applied to other cattle feeding and growing scenarios. Generally speaking, as long as VOG is greater than COG, a producer can make money by adding weight to the animal (Milacek, 2016)

Feeder calf buyers value preconditioning highly due to the health and performance benefits for calves as they enter stocker or feeding operations with feedlot performance being measurably improved in preconditioned calves versus only weaned calves. Research on the value of preconditioning to feedlot operators in Kansas showed that feedlots expected preconditioned cattle to likely have lower morbidity, lower mortality, higher feed efficiency, and higher average daily gain compared to cattle with no such programs (Schumacher et al., 2011). Additionally, feedlots indicated they were willing to pay at least $7/cwt more for 30-day preconditioned calves and $12/cwt more for 45-day preconditioned calves when compared to calves that had no certified health programs (Schumacher et al., 2011). Ward and Lalman (2007) reported a perceived value increase for preconditioned calves by feedlot managers of $5.25/cwt due to a perceived performance advantage. Feedlot performance data comparing preconditioned heifer calves weaned and shipped from a single farm and certified health program calves versus mixed origin calves showed reduced health costs, lower death loss and morbidity, and overall performance and economic gains in preconditioned animals when cattle were sold on a live weight basis (Cravey, 1996). Lalman and Mourer’s (2014)

review reported multiple studies indicating that preconditioning improved the health and reduced morbidity and treatment costs in the feedlot. Evaluation of feedlot cattle impacted by respiratory disease showed lower ADG, hot carcass weight (HCW) and marbling on affected animals (Schneider et al., 2009) Similar results as well as smaller ribeye area, and lower quality grades were observed in a similar study of 516 crossbred steers (Wilson et al.,2017). Profitability for cattle producers and increased feedlot performance and carcass quality including yields, fat thickness and carcass quality were reaffirmed in a compiled review of existing research regarding the effects and benefits of preconditioning on beef calves (Hilton, 2015). Based on data collected from feedlots, preconditioning is cost effective for feedlot operators who choose to make the investment, and cow-calf producers are likely to recover their costs should they choose to retain ownership of the calves. There has been some speculation that preconditioning may influence the carcasses of feedlot animals. Roeber et al. (2001) found no impacts on carcass traits or palatability of beef from preconditioned animals. Only animals with a certified vaccination program with no feeding or weaning requirements had a larger longissimus muscle, which was believed to be a treatment or genetic effect. Anderson et al. (2016) found that calves preconditioned for a period of 42 days versus only 21 days had heavier final live weights, carcass weights and greater fat thicknesses. While there is limited research correlating preconditioning to increased quality, it has been shown to reduce morbidity and illness in the feedlot and healthier animals in the feedlot generally have improved carcass traits as shown in previously cited works.

2.5. Conventional Auction

Conventional auctions held at local or regional stockyards are one of the most used marketing channels for cattle producers, but especially in states where producer herd size is small. Louisiana cattle producers have traditionally relied on the conventional auction method to market their cattle with 91 percent using conventional auction to market at least some of their cattle and 61 percent not using any other marketing outlets (Gillespie et al., 2004). Research has shown that conventional auctions, while a valuable tool for producers, are one of the highest cost and riskiest cattle marketing outlets due to limited buyer representation and smaller market (Guidry, 1993; Gillespie et. al, 2004). After incurring transportation costs, sellers may encounter problems with small buyer numbers, substantial shrink losses from shipping, and buyers at conventional auction being less likely to pay premiums for cattle with added value. Even if producers encounter a less than ideal market, not selling or pulling the animal out of auction may not be an option for producers due to already incurred costs and additional cost of returning the animal home (Gillespie et al., 2004). Many producers choose conventional auction due to limited production capabilities and inability to meet lot size requirements. However, it is believed many producers who could use alternative marketing arrangements fail to do so due to lack of information as well as comfort and familiarity with the conventional auction systems. If producers are provided with reliable information from a source they know and trust, they are more likely to use alternative markets for their cattle (Gillespie et al., 2004). Literature about factors affecting calf prices in both conventional auction, special sales, and group auction is fairly common (Buccola, 1982; Schroeder et al., 1988; Dhuyvetter and Schroeder, 1999; McHugh et

al., 2010; Troxel and Barham, 2012). Feeder cattle price differentials and pricing data are some of the most widely researched cattle marketing topics. Data used in pricing research is typically collected from a single market outlet type. Conventional auction is one of the most common types of data collection sites likely due to use by nearly all cattle producers (Buccola, 1982; Schroeder et. al, 1988; Troxel and Barham, 2012). Video auctions are also fairly common points of research (King et al. 2006; Zimmerman et al. 2012). There is relatively little recent research comparing multiple marketing outlets. Macartney et al. (2003) found that generally cattle in special auctions received a premium. Video auctions were slightly more profitable because of lower transaction costs and/ or higher net prices for producers (Bailey et al., 1991). Because video auctions don't require trucking expenses and have generally lower commission costs, sellers have lower transactional costs when using this outlet. Video auctions take place with buyers nationwide viewing the cattle, which can result in increased competition and higher prices generated for cattle. Additionally, buyers are more likely to be willing to pay a higher price because of the associated animal background information often provided with video auctions.

2.6. Group Sales

Group sales are any form of marketing in which cattle are sold in groups of similar type and weight. Group sales can take many forms and include components from other marketing systems such as lot size requirements, uniformity requirements, and remote purchase options with video auctions included. Group sales can occur within a normal conventional auction if the purveyor offers the service, or they can occur at special designated locations and dates for group sales. Some group sale options

even offer to pool with other sellers' cattle in order to create larger, more uniform lots that might command a better market price. Group sales may also include oral or text information about the background of the cattle being offered. Depending on the location and specifications of the group sale, buyers may bid in person, online, or using a phone. Whether the group sale is a special sale or simply a conventional auction that allows for lot sizes of 2 or more animals, sellers will typically see a premium on these animals vs. animals sold individually. Analysis of 2008-2013 sales data of a regional auction barn that hosted monthly video auctions of commingled groups of calves as well as weekly conventional auctions found a mean price of $110.16/cwt and $105.08, respectively (Hopkins et al., 2015). Troxel and Barham (2012) found that individual animals, groups of 2-6 animals, and groups of 6 or more sold for $107.81/cwt, $110.52/cwt, and $112.60, respectively in Arkansas auctions. Another evaluation of Arkansas auction data in 2000,2005, and 2010 found that calves sold in groups did receive a premium when compared to calves sold as singles (Troxel and Gadberry, 2013).

Cattle are typically held at the sale location and the buyer is responsible for paying for the cattle on site. The seller is responsible for transporting the cattle to the sale location, but the buyer is responsible for them after purchase. Depending on the venue, commission costs and miscellaneous expenses may vary. The typical bid on animals is based on their actual average weight the day of the sale. Sale dates can occur at special times or be held on a regular schedule year-round depending on the types of cattle being offered and production systems in that area. Pooling cattle with another producer requires an appropriate way to distribute payout if the payment is calculated on a pen basis.

2.7. Video Auctions

Video auctions of cattle, especially the Internet auction, are relatively new in the cattle production industry when compared to other marketing strategies. Access to Internet and satellite television with modern technology has made video auctions more widespread than ever before. Video auctions' best feature is the ease with which any lot can be seen by a large number of buyers, which tends to increase the price if the cattle being sold are desirable. It also creates an easier market for buyers who no longer have investments in travel time and expenses and are able to look at large numbers of cattle from a remote location. Literature since the 1990's has shown that video auctions are typically more profitable for cow calf producers than local auction barns due a number of factors including the larger number of buyers elevating prices and lower direct expenses for producers (Bailey et al., 1991; Schmitz et al., 2003). Video auctions can be especially beneficial for producers who use value-added health programs with their calf-crop, commanding a $7-8/cwt premium above the typically higher price of video auctions when compared to conventional auctions (Zimmerman et al., 2012). Analysis of over 30,000 sale lots by video auctions found lots with mentions of Beef Quality Assurance (BQA) averaged $1-3/cwt premium over those without BQA from 2000-2017 with the average in 2010 to 2017 being higher than earlier years (Mooney et al., 2019). Counter to these higher prices and benefits is that while a particular lot size is not necessarily a requirement, lots are almost exclusively truckload or larger sized in order for this market to be effective. Only about 3 percent of all Louisiana producers used video auctions although 17 percent of producers with over 100 head used it as a marketing outlet, implying ability to create truckload size lots is a deciding factor in

producer decisions to use this outlet (Gillespie et al., 2004). Video auctions can be a very useful marketing outlet due to its large buyer numbers, but many producers do not have the comfort level or herd size to use it successfully.

2.8. Retained Ownership

Retained ownership in the cattle industry is defined as the practice of cow-calf producers maintaining ownership of their calf crop beyond weaning, typically through the stocker and/or feedlot phases of beef production. Retained ownership is a beneficial option for many producers because it allows for flexibility in marketing timeline and enables producers to take advantage of seasonal price variation. Additionally, assuming cost of gain is lower than the price of finished cattle, producers can profit by adding weight to the animal. The decision to retain ownership is a difficult one for producers despite research showing that it is typically more profitable than selling calves at weaning (Tang et al., 2017; White et al., 2007; Fausti et al., 2003; Feuz and Wagner, 1994) because of the added risk of death loss and uncertainty of fed cattle prices when the calves are market weight. Furthermore, if producers have never used retained ownership as a strategy, they likely do not know how their cattle will perform when fed, which can make profitability of retained ownership less predictable. One major benefit to producers using this strategy besides the opportunity for increased returns is the ability to look at feedlot performance and carcass data, allowing producers to make informed adjustments to their herd genetic base (Lawrence, 2005). Carcass data in turn can allow producers to make better-informed decisions with their retained ownership marketing in terms of selecting live-weight or grid pricing basis for sales of feedlot finished cattle.

Most feedlot cattle are sold on a live-weight basis with a $/cwt price for each pen; however, owners or buyers of the cattle may suggest selling the cattle on a grid basis where cattle receive $/cwt price premiums or discounts per head based on the carcass characteristics of each animal. The base standard of most grid pricings is a yield grade 3, quality grade choice carcass weighing between 600-1050 lbs. (AMS, 2019c). Various premiums and discounts are applied based on the carcass measurements compared to these standards. Interest in grid sales as a value-based marketing system began as an effort to give producers knowledge on the type of product desired by consumers, and to increase beef's competition in the marketplace (Fausti et al., 1998). While the original purpose of the grid system was to help the beef industry as a whole by improving beef quality, it also serves to financially benefit those cattle producers who produce a higher quality product.

The combination of retained ownership being a high-risk strategy (Fausti et al., 2003; White et al., 2007) and producers being risk averse (Pope et al., 2011) explains the decisions by producers to not pursue retained ownership even when calf prices are historically low. Only 7% of cattle producers in Louisiana use retained ownership as a marketing strategy (Gillespie et al., 2004). More recently it was reported that only about 10% of cow-calf producers in Tennessee choose to retain ownership in the feedlot (Nelson, 2019). Louisiana's distance from the major feedlot and grain centers of the U.S. is a major factor, because producers would be expected to pay the shipping expense. Part of this decision may also be due to small average herd size in Louisiana, since a smaller calf crop makes it more difficult to create a uniform lot for feeding and smaller numbers mean less opportunity to average any losses over more animals.

2.9. Producer Factors in Outlet Selection

The major factors limiting producers' decisions in marketing avenue selection is herd size/lot size requirements. Certain marketing outlets such as video auction and types of group sales require large, uniform groups of calves (Ahola, 2007). With a small average herd size in the state, most producers find it difficult to create a uniform group size. Producers must either increase their herd size, which is limited by resources, or they can restrict their breeding and calving windows to try to increase uniformity, but in doing so they may reduce calf crop numbers due to missed breeding. Producers may elect to group cattle with other producers in order to access these marketing outlets. Pooling cattle consists of two or more producers attempting to combine their cattle to create one or more uniform lots of cattle in order to meet the requirements of a marketing outlet. Pooling presents its own set of difficulties since producers must be willing and available to pool cattle, and the cattle must be able to be pooled in an economical manner. If the differences in cattle quality, breed type, or weight are too great, or if the cattle are located too far apart to be economically pooled due to transportation costs, producers will be forced to find another outlet. Furthermore, even when pooling to meet lot size and other requirements, there will often be some cattle that do not fit the group or are not included due to variation, so producers are forced to find another market outlet for these few animals and incur added expenses in separating and transporting them. There may also be difficulties in apportioning the receipts among pooled cattle that receive a single price for the group.

Gillespie et al. (2004) showed that 39 percent of Louisiana producers use some type of alternative marketing practices in addition to conventional auction. Research in

Mississippi (a state with a very similar cattle environment to Louisiana) showed that only 34 percent of producers were willing to adopt alternative marketing practices due to inability to understand the direct benefits of alternative markets (Lacy et al., 2003). Ease of use and familiarity are highly influential in a producer's decision of marketing outlet. If a producer has used an outlet before, especially an alternative outlet, they are more likely to use that outlet again. Furthermore, while some users may be open to using alternative outlets, production location or more often, limited production capabilities, may prevent them from using that outlet (Ahola, 2007). The goal for producers should be to select an outlet that will lower their marketing costs and add the most market value to their animals, without major alterations to the current production scheme. Other options that producers may want to explore for pooling cattle and increasing knowledge about alternative marketing programs are university or extension sponsored marketing programs that allow producers statewide to pool cattle at one or a few satellite locations and sort them for various marketing outlets based on animal types and producer preferences. These programs are likely to have larger and more diverse groups of cattle for matching producer cattle while allowing for pooling with smaller or less uniform groups of animals.

2.10. Justification

Regardless of cattle markets, most producers want to be as profitable possible, and in order to increase profitability, must increase marketing efficiency of their cattle. Increased marketing efficiency can come from reduction of operating or marketing expenses, or by taking action to increase revenue from animals sold. Producers make use of information readily available to them in order to make marketing decisions, and

any information about the costs and benefits of various marketing strategies and outlets can help them to make better decisions, thereby increasing efficiency. Adding to the body of literature regarding cattle markets and profitability will allow them to make better informed decisions on what marketing methods to choose.

2.11. Pros and Cons of Each Marketing Outlet

Conventional Auction
- + Ease and familiarity of use
- + Regular sale schedule
- + No lot size or animal type requirements (good outlet for cull animals)
- + Cattle sale and payment is immediate
- – Price limited by physical buyers present
- – Limited designation of or premiums for added value practices
- – Seller responsible for trucking expense
- – Higher transaction cost

Video Auctions
- + Opportunity to have cattle seen by large number of buyers
- + Premiums more likely for added value practices
- + Buyer typically pays shipping expense
- + Lower transaction cost
- – Lot size and animal uniformity are essential
- – May require “holding” cattle for sale or buyer

Retained Ownership through the Feedlot
- + High return potential
- + Can provide information about animal performance and carcass quality
- + Helps producer make informed breeding decisions
- – Producer must operate without income from that calf crop until slaughter
- – Requires long distance trucking
- – Higher risk due to expenses, death loss, and unpredictability of future market
- – Intimidating to producers with no prior experience

Chapter 3. Materials and Methods

3.1. Procedures

A total of 561 weaned calves from LSU AgCenter Central Research Station, Hill Farm Research Station, and Louisiana cattle producers were utilized in various marketing outlets including retained ownership, video auctions, group sales, and conventional auction. Most of the cattle were ¼ or less brahman influenced with some animals being as high as ½ brahman influenced. Steers were knife cut castrated shortly after birth and any missed were banded when first round vaccinations were given. Any horned animals were dehorned via burning if the horn bud was small enough or surgically if the horn was large. Cattle were vaccinated with Bovishield Gold 5 or equivalent viral vaccine, Vision 8 or equivalent clostridial vaccine, Pasteurella vaccine, and valbazen or equivalent dewormer before the research period began. Producer animals were housed at Central Research Station in a separate pasture with no nose-to-nose contact with any other animals on the project. All animals were housed and cared for according to approved IACUC Protocol A2016-28. All cattle on the project were preconditioned between 45-58 days prior to sale or shipping to the feedlot and were fed a diet consisting of 74% cracked corn, 16% cotton seed meal, and 10% cottonseed hulls. The diet fed initially at 5 lbs. per head per day was gradually increased to 8 lbs. per head per day. Calves were also given free choice access to remaining or stockpiled forages in the pastures, consisting primarily of Bermuda grass. Mixed trace minerals were also available at all times. Animals were weighed on day 0 and the day prior to shipping. At the time of last weight collection, feeder cattle were graded and valued by a USDA cattle specialist.

Feeder grades were assigned in order to help more precisely assign estimated values to those cattle that were not marketed after preconditioning. Due to limitations with animal numbers, animals were not able to be sold in every marketing strategy each year. There were a limited number of comparisons able to be made between actual returns of various marketing outlets due to cattle in each marketing group being different in terms of weight, sex and/or type. Estimated values for outlets, particularly weaned and preconditioned animals, allowed us to compare cattle in the same market group as though they were sold in multiple marketing strategies, and make a more accurate comparison. Not all animals were able to be assigned feeder grades due to the specialist not being available or lack of recorded weights.

Table 3.1 shows the per animal costs of additional feeding, labor, and vaccinations of preconditioning as well as feedlot trucking cost. Feed cost was calculated by multiplying the per pound cost of feed times the average amount fed per animal over the preconditioning period. This calculation method was designed to eliminate the costs of animals in the group being preconditioned that were not to be included in this project.

Table 3.1. Preconditioning and trucking expenses

ADDITIONAL EXPENSES PER HEAD	
LABOR	$3.38
VACCINATIONS	$7.96
FEED	$43.88
TOTAL PRECONDITIONING COSTS	$55.22
TRUCKING TO FEEDLOT	$58.87
TOTAL COSTS TO FEEDLOT	$169.31

When preconditioning, grading, and final weighing was completed, cattle were sorted by weight and sex into their respective groups. There were no exact criteria for

any marketing outlet as long as the animals were in good health. After sorting, cattle were shipped to a conventional auction site, videoed for online auction, or shipped to a feedlot for retained ownership. Before determining the appropriate market for each animal, the calves were sorted to give the largest number of uniform animals into each group, with the larger groups allotted to markets assumed to give the highest value for the group. There was emphasis for uniformity and heavier weight for retained ownership as it was assumed the animals would be hardier for shipment and feeding and for uniformity in weight and color/breed type for video auctions since uniformity is most important in this outlet. Calves with lower weights or uniformity were assigned to regular auction outlets. Due to the limited number of animals for sorting, it was not possible to have the same uniformity or numbers of animals in each group. There were 389 animals sent to feedlots for retained ownership, 234 in 2016 and 155 in 2017. Heifers were selected for video auctions with 72 sold in 2017 and 52 in 2018 for 124 total while 42 heifers were sold in traditional auction outlets, with 14 sold as single animal lots and 28 sold at a different sale barn in small groups. It is important to note that cattle were labeled for consistency by year of marketing outlet, but those animals selected for retained ownership through the feedlot sold the year after they weaned i.e. 2017 feedlot animals were weaned in 2016. Market conditions at the time of weaning are relevant to the study.

Marketing expenses such as commission, yardage, feed, medical treatment, and Beef Checkoff expenses were collected directly from the specific marketing outlet. Shipping costs were obtained from the trucking company where applicable.

3.2. Pre-sale Values

The estimated cost to producers for raising a calf to weaning or calf cost was calculated based on LSU AgCenter's most recent annual livestock production budgets in Table 3.2 (Guidry, 2019). This cost was divided by 0.87 to account for the reported Louisiana average calf crop percentage of 87% to determine the per animal weaning value. This value was a base cost applied to every animal under each market outlet. This base cost represents the cow-calf producer's cost of raising a calf to weaning. This cost was held constant across all years of the study. While costs may vary from year to year, it was felt that they did not vary substantially during the study period, therefore, holding the value constant would not negatively impact the results of the study. Production costs have remained constant in recent years.

Table 3.2. Cow costs Louisiana (Guidry, 2019)

ADJUSTED ENTERPRISE BUDGETS	
Item	Cost Per Cow
Feed	$46.08
Forage (Ryegrass/Hay/Semi Improved Pasture)	$255.09
Medication	$20.00
Fuel	$15.11
Repair and Maintenance	$26.03
Labor	$104.01
Transportation	$5.88
Operating Interest Expense	$7.97
Total Variable Costs	**$480.17**

Calves were assigned a price by weaning weight based on AMS recorded average prices of similar weight and feeder graded calves in Alabama at the same time. Louisiana does not record sale data, so it was not available. Mississippi values were considered to be an acceptable proxy, but Mississippi does not report values with as much differentiation as Alabama. Alabama market reported values were averaged and

compared to Mississippi values on the same calf types over the same month and determined to be an acceptable proxy. The largest average differential between the state values at any given weight range was around 10 cents. Tables 3.3 and 3.4 display the average recorded prices of similar weight, frame score, and feeder grade steers and heifers, respectively, in the states of Alabama and Mississippi.

Assigned weaned calf price was multiplied by the weaning weight to obtain the value of calf at weaning. Cattle were weighed at the beginning and end of each preconditioning period; however, certified scales were not available. After final weights were collected, cattle were assigned a feeder grade based on USDA feeder grading standards by an expert cattle marketing specialist with over 35 years of experience. Retained ownership calves were assigned another price based on weights and dates at the conclusion of the preconditioning period since they were not sold at this time. Preconditioned value was determined by multiplying the animal price (either actual or assigned) times the animal weight at the conclusion of the preconditioning period.

Table 3.3. Average steer prices for Alabama and Mississippi by weight and year (NASS, 2019)

	300-400 lbs. L-M 1&2[a]		400-500 lbs. L-M 1&2[a]		500-600 lbs. L-M 1&2[a]	
Year	Alabama	Mississippi	Alabama	Mississippi	Alabama	Mississippi
2016	$ 173.86	$174.46	$ 145.81	$ 155.19	$ 133.01	$ 141.24
2017	$ 167.73	$166.50	$ 145.49	$ 152.40	$ 135.12	$ 141.97
2018	$ 173.72	$172.37	$ 150.89	$ 157.45	$ 138.63	$ 146.33
3 Year Avg.	**$ 171.75**	**$171.15**	**$ 147.39**	**$ 155.00**	**$ 135.58**	**$ 143.13**

[a]L-M 1 & 2 are large and medium frame and 1 and 2 muscling score.

Table 3.4. Average heifer prices for Alabama and Mississippi (NASS, 2019)

	300-400 lbs. L-M 1&2[a]		400-500 lbs. L-M 1&2[a]		500-600 lbs. L-M 1&2[a]	
Year	Alabama	Mississippi	Alabama	Mississippi	Alabama	Mississippi
2016	$ 152.11	$ 153.06	$ 127.62	$137.93	$ 117.61	$ 130.34
2017	$ 144.08	$ 145.99	$ 124.58	$136.11	$ 118.10	$ 128.22
2018	$ 147.16	$ 147.04	$ 128.29	$137.22	$ 119.60	$ 129.49
3 Year Avg.	**$ 147.76**	**$ 148.77**	**$ 126.81**	**$137.09**	**$ 118.43**	**$ 129.36**

[a]L-M 1 & 2 are large and medium frame and 1 and 2 muscling score.

3.3. Conventional Auction

Animals for conventional auction were sent to two different sites in the same region of the state. Both sites stated the preconditioned status of the calves and the single-source background to buyers prior to sale. One site auctioned the cattle individually while the other grouped the animals into groups of two or more before selling them, with the largest group containing 13 calves with an average of 5.3 calves per group. Values were averaged per animal for the group animal sales and values for the individual sale animals were actual values. Trucking costs were estimated by state budgets or actual recorded costs when a stockyard-supplied shipper was used. Tables 3.5 and 3.6 show values of heifers comparable to those sold after preconditioning on the same weeks of sale. These prices are used for reference for animals sold after weaning and preconditioning and to show average values of animals comparable to those used on the project.

Table 3.5. Prices for heifers in Alabama by weight and feeder grade 9/23/2017 (AMS, 2019b)

	300-350 LBS.	350-400 LBS.	400-450 LBS.	450-500 LBS.	500-550 LBS.	550-600 LBS.	600-650 LBS.
L1[a]	$170.00	$157.00	$148.00	$145.00	$135.50	$134.00	$127.00
L2[a]	$157.00	$145.00	$135.00	$130.00	$127.50	$123.00	$120.00
L3[a]	$145.00	$137.00	$129.00	$124.00	$122.00	$120.00	$115.00
M1[a]	$140.00	$132.00	$129.00	$127.00	$122.00	$119.00	$117.00
M2[a]	$127.00	$122.00	$116.00	$114.00	$110.00	$105.00	$106.00
M3[a]	$115.00	$110.00	$110.00	$110.00	$108.00	$100.00	$100.00

[a]L-M 1,2, & 3 are large and medium frame and 1,2, & 3 muscling score.

Table 3.6. Prices for heifers in Alabama by weight and feeder grade 11/3/2018 (AMS,

	300-350 LBS.	350-400 LBS.	400-450 LBS.	450-500 LBS.	500-550 LBS.	550-600 LBS.	600-650 LBS.
L1[a]	$165.00	$155.00	$137.00	$135.00	$131.00	$130.00	$155.00
L2[a]	$145.00	$140.00	$130.00	$125.00	$135.00	$134.00	$115.00
L3[a]	$130.00	$122.50	$120.00	$122.00	$119.00	$110.00	$110.00
M1[a]	$137.00	$131.00	$126.00	$121.00	$118.00	$117.00	$113.00
M2[a]	$130.00	$125.00	$119.00	$115.00	$112.00	$110.00	$106.00
M3[a]	$118.00	$115.00	$110.00	$104.00	$100.00	$100.00	$95.00

[a]L-M 1,2, & 3 are large and medium frame and 1,2, & 3 muscling score.

3.4. Video Auctions

Due to limited animal availability, heifers were used in this outlet both years. Heifers were selected and sorted into a separate group at the conclusion of the preconditioning period. Animals were selected for video auctions to have the narrowest ranges in terms of weight and color. After being grouped, they were video recorded by a representative of Superior Livestock for sale in the earliest available auction.

3.5. Feedlot Sales

Animals selected for retained ownership were shipped via 18-wheel semi-trailer to a feedlot for privately owned cattle in the panhandle of Oklahoma. This location was

selected due to its proximity to major grain centers of the U.S. and large size with expected lower costs. Upon receipt at the feedlot, cattle were weighed, implanted, retagged by feedlot personnel for means of identification, and were moved to pens for the remainder of time in the feedlot. Feeding and management of the cattle were entirely at the feedlot's discretion. When cattle reached slaughter weights, the decision was made to sell the cattle on a live weight or grid basis based on recommendations from the feedlot manager and considering the contemporary cattle markets. Cattle were offered for sale and the highest bid was taken. Feedlot incurred costs for each pen were deducted from the total bid price on the cattle. The processing facility recorded carcass weights and all relevant carcass data including yield and quality grades. Because no individual animal final live weights were recorded or provided by the feedlot, individual animal values for live weight sales were calculated based on carcass weights and dressing percentage for each pen. Values on grid sales were actual values of each animal's carcass.

3.6. Data Analysis

Analysis was performed using R and a one-way Anova with a Tukey test was performed to compare market groups and determine statistically different ($P<0.05$) recorded values for each group. Comparisons were made of all total market avenues (n=561), all heifers sold in 2017 (n=136), all steers sold in 2017 (n=168), sale method regardless of year (n=561), sale method regardless of year and sex (n=561), heifers sold on a grid basis in 2017 and 2018 (n=64 and n=50, respectively), and steers sold on a grid basis in 2017 and 2018 (n=58 and n=90, respectively).

Table 3.7. Cattle marketed in each outlet by year and feeder grade.

	Frame Size	Conventional Auction	Group Sale	Video Auction	Feedlot Live Sale	Feedlot Grid Sale
2017 Steers	S				1	7
	M				40	41
	L				69	10
	Not Graded					3
2017 Heifers	S					7
	M			18		31
	L			18		26
	Not Graded			36		
2017 Total				**72**	**110**	**125**
2018 Steers	S					22
	M					47
	L					21
	Not Graded					
2018 Heifers	S	3	1			
	M	9	11	29		
	L		6	23		
	Not Graded	2	10			70
2018 Total		**14**	**28**	**52**		**160**

[1]

[1] Subheadings S,M. and L refer to feeder grades small medium and large

Chapter 4. Results & Discussion

Implications of the study are limited due to the way(s) in which the cattle were sorted and distributed amongst various marketing practices and due to the years and market conditions in which the study took place. Ideally, an equal number of similar types of cattle would have been distributed across each marketing outlet. Due to the limited size of the pool of cattle used, it would have been unfeasible to create appropriate groups for certain markets and grouping of calves to have equal distributions of various types and sexes would have been economically unrealistic and impractical for certain marketing outlets such as retained ownership through the feedlot and video auctions.

4.1. Comparison of All Marketing Strategies

Table 4.1 showed that there are differences ($p<0.05$) in weaning weights and preconditioned weights of groups of cattle on the project. Comparably, beef calves in the U.S. in 2009 had average weaning weights of 559 lbs. for steers, 515 lbs. for heifers, and a total average weight of 530 lbs. for all calves (NAHMS, 2009). This was expected since cattle were sorted by preconditioned weights and preconditioning gains were positive. Weight gains were within the range expected based on individual calf performance and feed resources. McCollum and Gill (2000) reported gains ranging 0.26 to over 2 lbs. per day depending on the cattle. There were also weight differences between the 2017 and 2018 steers sold on a grid basis likely due to pre-weaning treatment of the animals, as the stocking rates of cows were going to be increased that fall, and farm management decided to wean the calves early.

Figure 4.1 shows the distribution of assigned feeder grades in each marketing group. One notable point is that feedlot groups 2016 Live Steers, 2016 Grid Heifers, 2017 Grid Steers, and 2018 Video Heifers generally contained larger and heavier muscled animals despite feeder grade not being criteria for sorting.

Figure 4.2 shows the percentages of each grade per marketing outlet. These percentages mirror the previous figure with higher percentages of large frame and high muscling grades in the 2016 Live Steers, 2016 Grid Heifers, 2017 Grid Steers, and 2018 Video Heifers.

Feedlot data in Table 4.2 showed differences ($p<0.05$) in animal weights upon entry into the feedlots; again, this is understandable since the animals were sorted by weight for uniformity. All values for these groups are averages with the exceptions of days in feedlot and death loss which are group totals. As expected, the lightest animals upon entry spent the most time in the feedlot. Carcass weights also showed differences ($p<.05$) between groups. One notable point is that the steers with the longest times in the feedlot had higher carcass weights, but this was not true for heifers. This could be due to genetics of the heifers in question, or environmental factors based on the year. Pens of steers with heavier carcass weights had less desirable yield grades while heifers did not. The most likely explanation is genetic effects, since the 2017 heifers were sourced from Central Research Station while the 2018 Heifers were from Hill Farm Research Station. There was higher mortality in the 2018 groups. It is believed that an earlier weaning time in the fall of 2017 for the Central Station cattle had an effect since less mature, lighter weight calves generally have higher morbidity and mortality (Maday, 2016).

Table 4.1. Weaning and preconditioning weights (lbs.) for cattle marketed in 2017 and 2018

	2017 Grid Heifers	2017 Group Heifers	2017 Individual Heifers	2017 Video Heifers	2017 Grid Steers	2017 Live Steers	2018 Video Heifers	2018 Grid Steers	MSE
WW[a]	440.49[c]	444.70[c]	371.31[d]	512.25[b]	445.03[c]	582.60[a]	557.78[a]	502.43[b]	3865.11
PCW[b]	496.83[d]	453.45[ef]	391.54[f]	543.22[bc]	490.00[de]	655.05[a]	569.75[b]	527.12[c]	3795.39
WG[c]	67.12	10.82	20.23	30.97	44.97	72.46	11.96	59.26	14973.01
ADG[d]	1.49	0.24	0.45	0.69	1.00	1.61	0.27	1.32	7.39

[2, a]Weaning weight, [b]Preconditioned Weight, [c]Weight gain, [d]Average daily gain.

[2 a-e] Means in a row with different letters are different (P<.05)

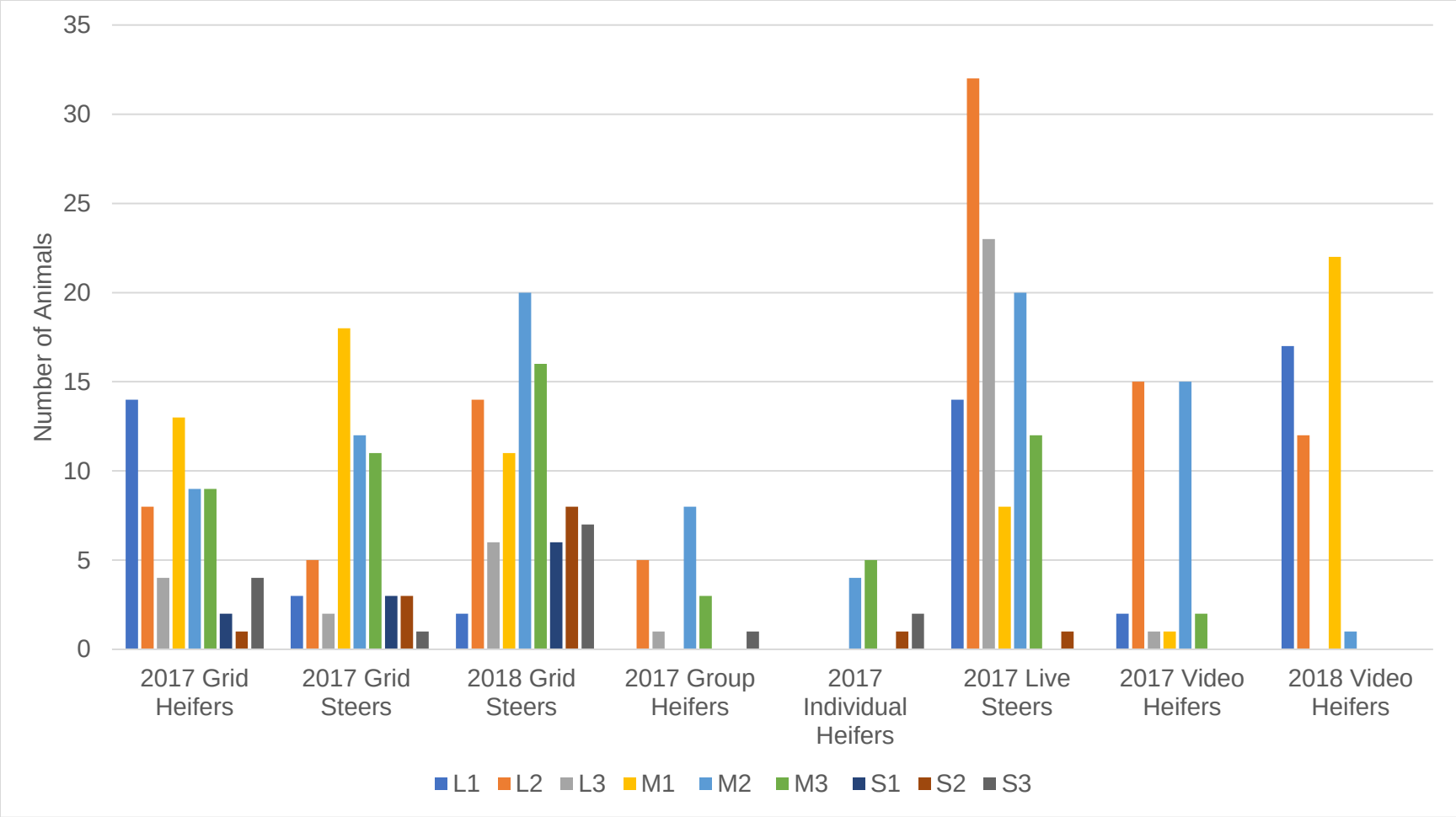

Figure 4.1 Feeder grade distribution of cattle with different marketing channels[3]

[3] L1-S3 refer to the frame scores large, medium and small combined with muscling scores 1,2, and 3

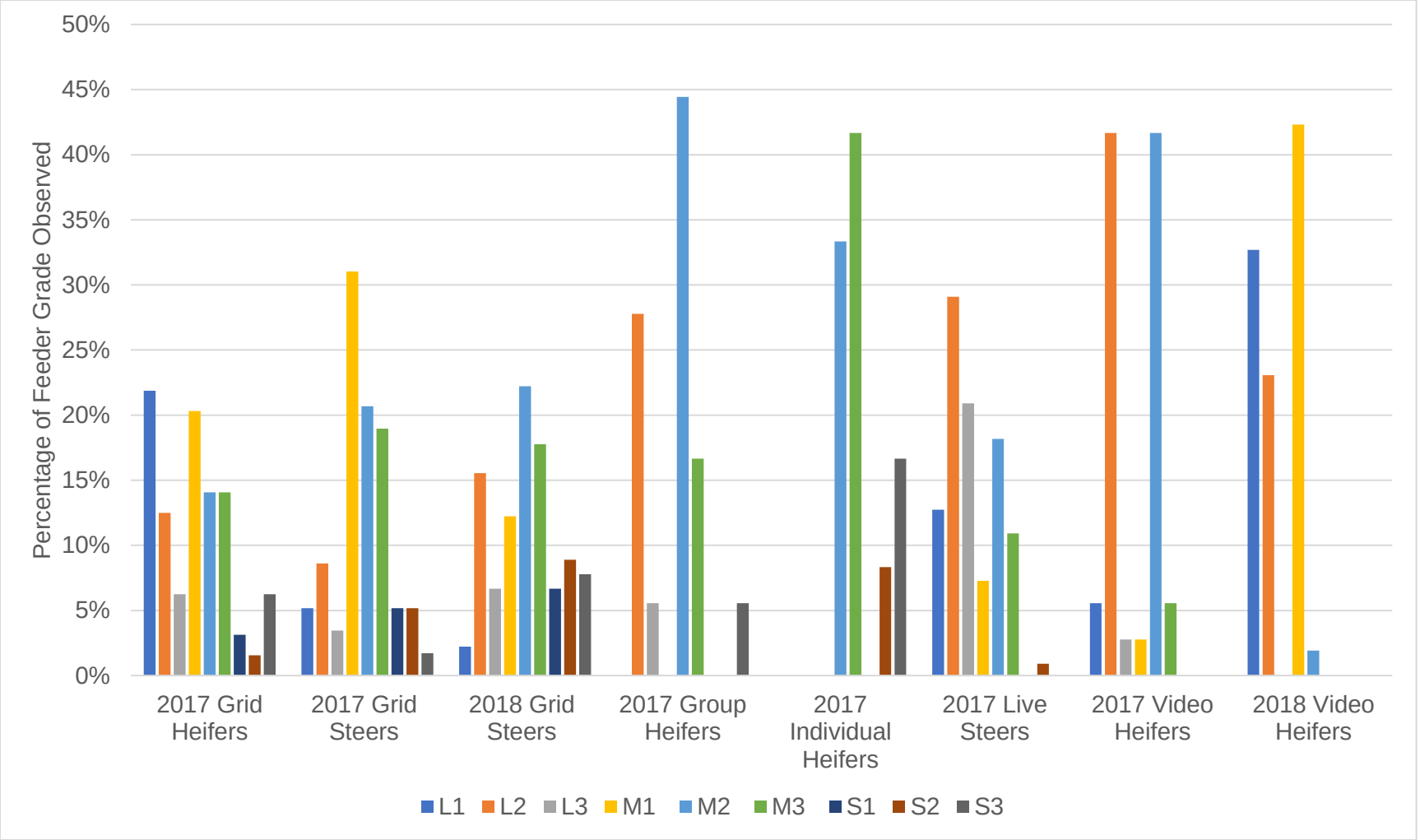

Figure 4.2. Feeder grade percentage of cattle with different marketing channels.[4]

[4] L1-S3 refer to the frame scores large, medium and small combined with muscling scores 1,2, and 3

Figure 4.3 shows the yield grade distribution for each of the retained ownership groups and Figure 4.4 shows the same data with the observations as percentage of each group. Higher yielding animals were more prevalent in the 2017 groups, particularly the carcass heifers and live steers.

Figure 4.5 shows the distribution of quality grades for each retained ownership group. The majority of feedlot cattle graded Choice, with the highest percentage Choice and Prime being the 2017 steers sold on grid basis with 94% and the lowest being the 2017 heifers sold on a grid basis with 76%. The average of all cattle finished in the feedlot was that 82% of cattle sold graded Choice or better. Quality grades were similar to expectations considering the USDA national average for fed cattle grading Choice and Prime in 2017 and 2018 was also 82% (2019).

Figure 4.5 shows the distribution of quality grades for each retained ownership group. The majority of feedlot cattle graded Choice, with the highest percentage Choice and Prime being the 2017 steers sold on grid basis with 94% and the lowest being the 2017 heifers sold on a grid basis with 76%. The average of all cattle finished in the feedlot was that 82% of cattle sold graded Choice or better. Quality grades were similar to expectations considering the USDA national average for fed cattle grading Choice and Prime in 2017 and 2018 was also 82% (2019).

Table 4.2. Feedlot data for steers and heifers in 2017 and 2018 sold on carcass or live weight basis.

	2017 Grid Heifer	2017 Grid Steer	2017 Live Steer	2018 Grid Heifer	2018 Grid Steer	MSE
Weight entering Feedlot	496.83[c]	490.00[c]	655.05[a]		527.12[b]	4819.42
Number of days in Feedlot	259.00[c]	277.00[a]	209.80[d]	264.00[b]	257.77[c]	57.02
Carcass Weight	798.89[b]	915.57[a]	884.58[a]	774.12[b]	889.82[a]	8242.00
Yield Grade	2.23[b]	3.25[a]	2.11[b]	3.22[a]	3.18[b]	0.86
Quality Grades	Choice	Choice	Choice	Choice	Choice	
Death Loss	3%	5%	4%	13%	10%	

[5]

[5] [a-c] means in a row with different letters are different ($p<0.05$)[5]

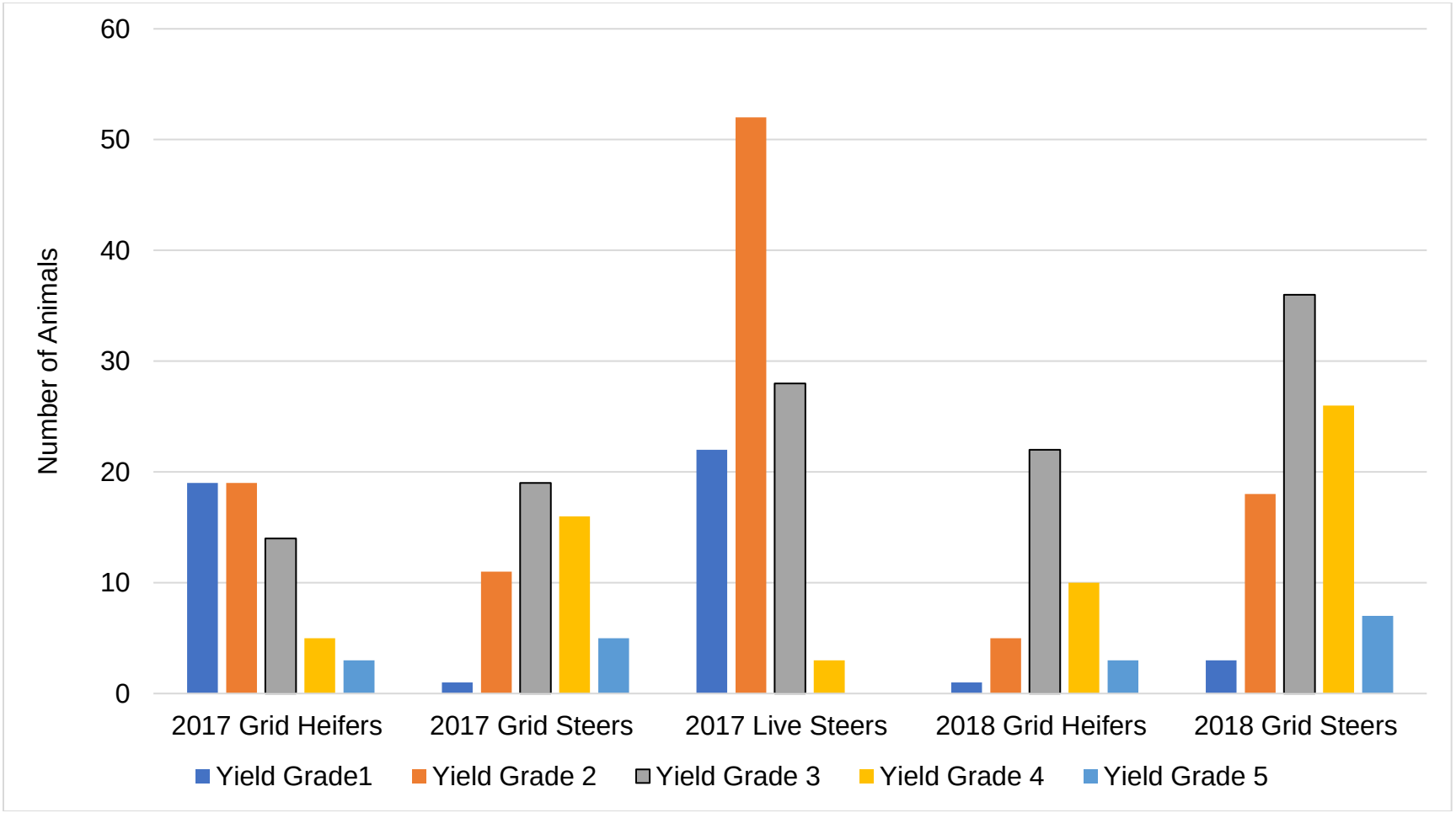

Figure 4.3. Yield grade distribution of feedlot cattle with different marketing channels.

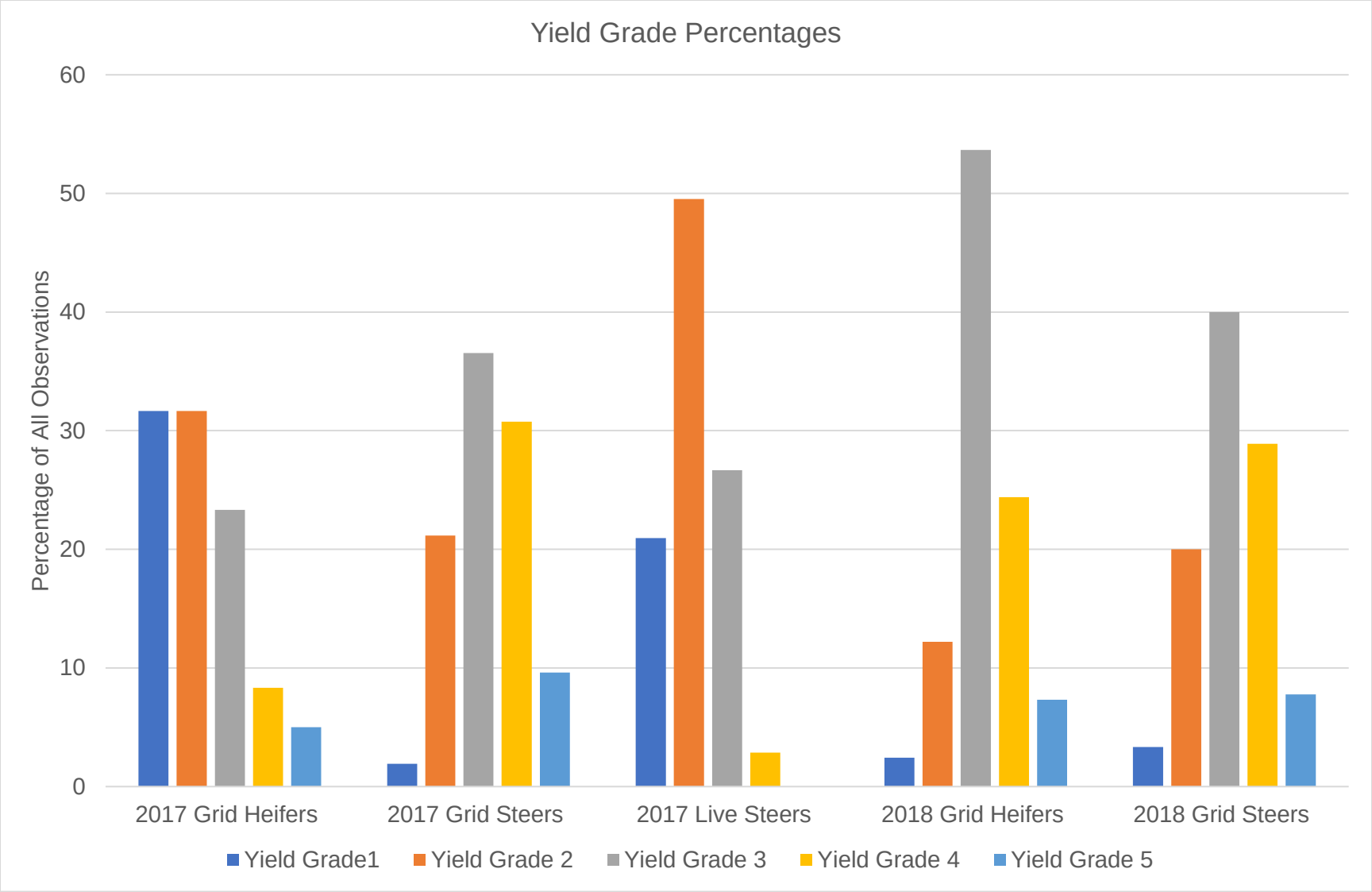

Figure 4.4. Yield grade percentage distribution of feedlot cattle with different marketing channels

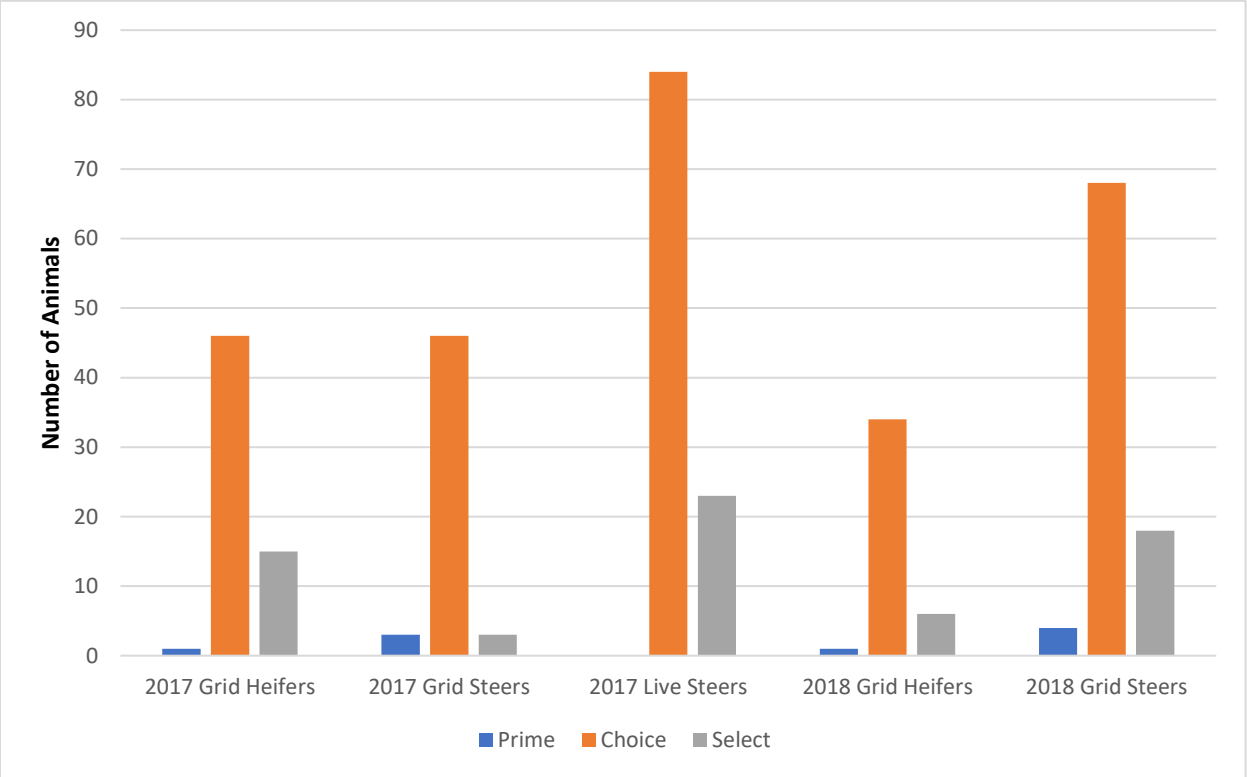

Figure 4.5. Quality grade distribution of feedlot cattle with different marketing channels.

Table 4.3. Average prices for slaughter cattle from 2016-2018

YEAR 2018		Head Count	Avg Weight	Avg Price
Live	Steer	1,966,611	1,426.40	$116.68
Live	Heifer	947,053	1,281.20	$117.51
Dressed	Steer	784,000	915.90	$184.73
Dressed	Heifer	328,418	832.00	$186.04

YEAR 2017		Head Count	Avg Weight	Avg Price
Live	Steer	1,865,522	1,409.00	$121.74
Live	Heifer	985,517	1,275.40	$121.79
Dressed	Steer	736,556	907.20	$194.27
Dressed	Heifer	331,445	830.60	$192.57

YEAR 2016		Head Count	Avg Weight	Avg Price
Live	Steer	1,583,629	1,432.40	$119.58
Live	Heifer	862,990	1,298.80	$120.17
Dressed	Steer	883,507	922.30	$190.79
Dressed	Heifer	423,046	839.80	$191.78

Source: USDA Livestock, Poultry & Grain Market News Division, St. Joseph, MO
816-676-7000 email: stjoe.lpgmn@ams.usda.gov
www.ams.usda.gov/market-news/livestock-poultry-grain

4.2. Average Slaughter Values 2016-2018

Table 4.4 shows the financial data results of the comparison of all groups. This table includes prices, costs and returns from weaning, preconditioning, and sale value. Missing estimated values are a result of inability to assign prices to that group of animals due to lack of weight or feeder grade assignment, if they were not marketed in an outlet that calculated those values. Differences in estimated weaning costs despite using the same base value are a result of higher estimated commissions to sell heavier animals. There were differences ($p<0.05$) among estimated weaning sale prices in all groups represented. The price difference between sexes is common for most feeder cattle, since steers typically command a higher price than heifers (Peel and Riley, 2018). The year-to-year difference in steer prices markedly mirrors the drastic increase in nationwide cattle prices from 2016 to 2017 (NASS, 2019). Following a feeder cattle price bubble in 2014 and early 2015, cattle prices were at near record lows throughout 2016, followed by a surge in prices in the early parts of the following year, though still not as high as two to three years prior. The most notable point is the lack of significant difference in estimated prices between the 2017 steer groups despite a large difference in average weight. Lighter weight steers usually command a higher unitary price than comparable heavy weight steers (Peel and Riley, 2018). The most reasonable explanation would be that the steers sold on a live weight basis had larger frame and heavier muscled feeder grades since higher muscle score and high-medium to low-large frame grading cattle usually command higher prices (Duggan and Stewart, 2017). The estimated returns at weaning were different ($p<0.05$) between groups with the steers having generally higher returns than the heifers. The likely reason for the 2017

live steers having higher estimated returns in the same period (Fall 2016) than the 2017 carcass steers was due to heavier weaning weights, while the estimated returns for the 2018 carcass steers were even higher due to market prices (NASS , 2019). While estimated preconditioning sale prices did show significant differences, it is important to note that the 2017 Individual, Group, and Video Auctions heifers were sold immediately after preconditioning, and the prices reported for these groups were actual and the same was true for costs after preconditioning and returns after preconditioning. The video heifers had much higher returns after preconditioning than any of the other groups. These results are consistent with findings of previous research that found returns of animals auctioned through video to be higher than those sold through traditional auction methods (Bailey et al.,1991; Schmitz et al., 2003), but somewhat more drastic most likely due to the higher average weights of the video heifers when compared to the other heifer groups sold after preconditioning.

Feedlot costs were all different ($p<0.05$), with the costs directly related to the number of days in the feed yard, the exception being 2018 carcass heifers. This was almost certainly due to the high death loss that must be accounted for and so is included in the total costs. Since there were fewer animals in that pen over which to distribute the cost at the end of finishing, the cost per animal was higher. Mortality is one of the largest expenses to retained ownership since cattle incur not only the feedlot expense of each animal lost, but also the opportunity cost of not having sold that animal sooner (Maday, 2016).

Final costs through market displayed significant differences among all of the feedlot groups; however, marketing costs for all groups sold after preconditioning

including both auction barn and both video auctions groups displayed no differences ($p>0.05$). The added costs of sending cattle to the feedlot for retained ownership is very substantial, but with some feedlots, the costs are not required to be paid on a regular basis and can simply be deducted from final sale value of each pen.

Returns after marketing showed differences ($p<.05$) in every group. Values for these groups were consistent with the belief that retained ownership is typically one of the most profitable ways to market cattle, and conventional auctions are one of the least profitable. The differences among the groups were greater than expected, especially with the extremely high returns from the 2017 live steer group. The most likely explanation for the performance of these cattle was an unexpected price increase in the spring of 2017, causing the dollar per pound value of these steers as slaughter cattle to be higher than it would have been for them as weaned calf feeders in the fall of 2016. This phenomenon, while not impossible, is highly improbable to occur very frequently. Additionally, traditional price cycles have feeder cattle at higher live weight values in the spring and early summer. The 2017 Live Steers happened to finish at a time to take advantage of both cycles. 2017 Grid Steers finished much later in the year when seasonal fed cattle prices are lower. While the cattle were sold in different methods, grid pricing base price may be impacted by seasonal price cycles. Therefore, low average prices for fed cattle at that time may have meant a lower base price for the grid steers carcass traits to be based from, negatively impacting final gross animal values in addition to the group being higher cost. These combined phenomena may help explain the difference in final returns despite the 2017 Grid Steers being an otherwise more desirable group by normal market standards. Another notable point was the low

profitability of the 2018 carcass heifers. Again, this is almost certainly due in part to the high death loss of that group, combined with a generally lower value for heifers than for steers.

4.3. 2017 Heifers

Comparisons of all heifers that were born in the spring of 2017 was revealing that despite significant differences following the same pattern for most data points analyzed, the retained ownership group was not very profitable. Due to the added expense and time to wait for revenues of retained ownership and the lost opportunity cost from not selling the calves at weaning, retained ownership is a far less attractive market avenue than video auctions, barely managing to net a positive return for the cattle on this project. The individual and group auction heifers lost money through both marketing avenues, more notably in the individual heifers, likely as a result of lower sale weight, but nearly identical costs to reach weaning. Furthermore, research has traditionally shown that larger lot size has a positive impact on cattle values, especially with auction pricing. Even though cattle were not sold on the same day and in the same venue, selling in small groups did seem to generate higher animal values.

Table 4.4. Estimated and real costs and values from weaning to sale

	2017 Grid Heifers	2017 Group Heifers	2017 Individual Heifers	2017 Video Heifers	2017 Grid Steers	2017 Live Steers	2018 Grid Heifers	2018 Video Heifers	2018 Grid Steers	MSE
Estimated Cost at Weaning per animal	574.66[d]				577.86[c]	584.06[b]			588.44[a]	16.76
Estimated Weaning Sale Price per cwt	96.75[c]				109.18[b]	107.10[b]			134.81[a]	84.76
Estimated Returns at Weaning per cwt	-139.81[d]				-79.07[c]	38.82[b]			121.93[a]	6050.50
Estimated Cost after Precon per animal	642.77[e]	613.70[e]	613.70[e]	613.95[e]	645.05[c]	652.76[b]		614.74[e]	654.89[s]	13.88
Estimated Precon Sale price	98.96[e]	138.01[b]	132.85[b]	145.00[a]	109.82c	104.06[d]		137.00[b]	133.44[b]	62.09
Returns at Precon	-135.07[d]	-30.71[c]	-122.64[d]	173.72[a]	-99.22[d]	32.70[b]		165.81[a]	62.87[b]	5710.61
Net Sale Value		582.99[c]	491.06[e]	773.80[a]				751.32[b]		1175.90

(table cont'd.)

	2017 Grid Heifers	2017 Group Heifers	2017 Individual Heifers	2017 Video Heifers	2017 Grid Steers	2017 Live Steers	2018 Grid Heifers	2018 Video Heifers	2018 Grid Steers	MSE
Total Feedlot Cost per animal	565.69[d]				661.31[b]	524.59[e]	673.37[a]		631.15[c]	191.45
Carcass Price per cwt	188.05[b]				172.86[c]	203.46[a]	174.67[c]		183.38[b]	127.85
Gross Revenue Feedlot per animal	1501.28[c]				1580.34[bc]	1848.67[a]	1351.57[d]		1651.94[b]	34627.41
Total Cost Through Market per animal	1249.89[d]	613.70[f] 651.19	613.70[f] 636.63	613.95[f]	1349.56[a]	1212.06[e]	1274.13[c]	614.74[f]	1317.96[b]	82.84
Returns after Market per animal	275.49[bc]	-30.71[e]	-122.64[e]	159.85[d]	241.13[cd]	644.04[a]	14.58[e]	136.58[d]	374.37[b]	29433.93

[6] [a-e] Means in a row with different letters are different (P<.05)

Table 4.5. 2017 born heifers marketed through the feedlot on carcass weight basis, video auctions, or in local sale barns in small groups or individually

	WW	Days in Precon	Weight after Precon	Weight Gain in Precon	ADG during Precon	Estimated Precon sale price	Estimated cost after Precon	Returns at Precon	Net Sale Value	Total cost though Market	Returns after marketing
2018 Grid		45								1274.13[a]	14.58[b]
Video	512.25[a]	48	543.22[a]	60.61	1.34	145.00[a]	613.95[a]	173.72[a]	773.80[a]	613.95[b]	159.85[a]
Group	444.70[b]	46	453.45[b]	98.15	2.18	138.01[b]	613.70[b]	-30.71[b]	582.99[b]	613.70[c]	-30.71[c]
Individual	317.31[a]	46	391.54[c]	65.85	1.46	132.84[c]	613.70[b]	-122.64[b]	491.06[c]	613.70[c]	-122.64[d]

[7]

4.4. 2017 Feedlot Steers

Table 4.6. Steers sold on a carcass or live weight basis in 2017.

	Estimated Cost after Precon	Estimated Returns at Precon	Weight entering Feedlot	Number of Days in the Feedlot	Carcass Weight	Yield Grade	Quality Grade	Total Feedlot Costs	Carcass Price
Grid	645.05[a]	-99.22[b]	490.00[b]	277.00[a]	915.57[a]	3.25[a]	Choice	661.31[a]	172.86[b]
Live	652.76[b]	32.70[a]	655.05[a]	209.80[b]	884.58[b]	2.11[b]	Choice	524.59[b]	203.46[a]
MSE	23.43	7353.59	4384.27	19.87	7064.22	0.70		83.12	97.98

(table cont'd.)

[7] [a-c] means in a column with different letters are different (P<0.05)

	Weaning Weight	Estimated Weaning Sale Price	Estimated Cost at Weaning	Estimated Returns at weaning	Days in Precon	Weights after Precon	Weight gained in Precon	ADG in Precon	Estimated Precon Sale Price
Grid	445.03[b]	109.18	577.86[b]	-79.07[b]	45	490.00[b]	44.97[b]	1.00[b]	109.82[a]
Live	582.60[a]	107.10	584.06[a]	38.82[a]	45	655.05[a]	72.46[a]	1.61[a]	104.06[b]
MSE	5190.66	86.55	15.88	5733.09		4384.27	5251.71	2.59	101.20

	Gross Revenue from Feedlot	Total Cost Through Feedlot	Returns though Feedlot
Grid	1580.34[b]	1349.56[b]	241.13[b]
Live	1848.67[a]	1212.07[b]	644.04[a]
MSE	26071.35	87.55	22690.86

8

[8] [a-b] means in a column with different letters are different (P<0.05)

The two groups of 2017 steers showed differences ($p<0.05$) in all recorded data, most likely because the majority of the animals were from the same calf crop at LSU AgCenter Central Research Station and were sorted into two groups based on weight in order to create as much pen uniformity as possible before sending the groups to the feedlot. The heavier group was sold on live weight and the group weighing 165 pounds less when entering the feedlot was sold on a carcass basis. Returns were substantial on both groups with the steers sold on a carcass basis showing typical expected returns when compared to the reported data average for that time period in Kansas (Tonsor, 2019). The much higher returns on the live steers likely resulted from the combined factors to reach desired slaughter weight of the normal slaughter animal price cycle and a market uptick combined with a shorter stay in the feedlot that resulted in lower costs. Due to low feeder calf prices in the fall of 2016 and high slaughter calf prices in most of 2017, these groups of cattle had substantially higher returns being retained than would be expected had they been sold at weaning.

4.5. Sale Method by Year

Sale methods were compared by year regardless of sex in order to get a better idea of the impact of price changes over the period of the study (Table 4.7). Returns were similar to other comparisons with the notable difference that there was no significant difference between the 2017 and 2018 carcass sale groups. In prior comparisons, the 2018 carcass steers had a much higher net return than the 2017 steers; however, the heifers in 2018 had such low net revenue that the average net revenue was drastically decreased for that year.

Table 4.7. Sale method by year regardless of sex

	2017 Grid	2017 Group	2017 Individual	2017 Live	2017 Video	2018 Grid	2018 Video	MSE
Average Weaning Weight	442.72[c]	444.70[c]	371.31[d]	582.60[a]	512.25[b]	502.43[b]	557.79[a]	3858.32
Estimated Weaning Sale Price	102.79[c]			107.10[b]		134.81[a]		98.85
Estimated Cost at Weaning	576.21[c]			584.06[b]		588.44[a]		17.65
Estimated Returns at Weaning	-110.33[c]			38.82[b]		121.93[a]		6372.52
Days in Precon	45	46	46	45	48	45	58	
Weight after Precon	493.53[d]	453.45[e]	391.54[f]	655.05[a]	543.22[b]	527.12[c]	569.75[bc]	3790.61
Weight Gain in Precon	56.67	10.82	20.23	72.46	30.97	59.26	11.96	14973.62
ADG Precon	1.26	0.24	0.45	1.61	0.69	1.32	0.27	7.39
Estimated Precon Sale price	104.14[c]	138.01[b]	132.85[b]	104.06[b]	145.00[a]	133.44[b]	137.00[b]	69.05
Estimated Cost after Precon	643.89[c]	613.70[d]	613.70[d]	652.76[b]	613.95[d]	654.89[a]	614.74[d]	14.15

(table cont'd.)

	2017 Grid	2017 Group	2017 Individual	2017 Live	2017 Video	2018 Grid	2018 Video	MSE
Returns at Precon	-117.50[d]	-30.71[c]	-122.64[d]	32.70[b]	173.72[a]	62.87[b]	165.81[a]	5772.48
Net Sale Value		582.99[c]	491.06[d]		773.80[a]		751.32[b]	1175.90
Weight entering Feedlot	493.52[d]			655.05[a]		527.12[b]		4809.27
Number of days in Feedlot	267.50			209.80		259.64		
Carcass Weight	852.66			884.58		860.48		10577.97
Yield Grade	2.71[b]			2.11[c]		3.19[a]		0.94
Quality Grades	Choice			Choice		Choice		
Total Feedlot Cost	610.82[b]			524.59[c]		643.82[a]		1069.83
Carcass Price	181.05[b]			203.46[a]		180.65[b]		152.04
Gross Revenue Feedlot	1537.71[b]			1848.67[a]		1557.63[b]		42200.75
Total Cost Through Market	1297.16[a]	613.70[c]	613.70[c]	1212.06[b]	613.95[c]	1298.12[a]	614.74[c]	706.42
Returns after Market	259.20[b]	-30.71[d]	-122.64[d]	644.04[a]	159.85[c]	221.19[bc]	136.58[c]	36302.3

[9]

[9] [a-f] means in a row with different letters are different (P<0.05)

4.6. Grid Heifers 2017-2018

Table 4.8 shows the analysis of all available data for the heifers sold on a grid basis in both years. Values were significantly different in all financial data; however, the carcass weights were not different. Heifers sold in 2017 had lower cost, higher price, and a substantially lower death loss than those in 2018. All of these factors with a higher average feeder price for that year are reflected in the returns after feedlot for each group. Without the substantial death loss present in the group sold in 2018, it is likely that the returns would have been much closer.

4.7. Grid Steers 2017-2018

Table 4.9 shows the results of comparing the steers sold on a grid basis in both years. While all the values of these two groups analyzed did show significant differences, especially in terms of values prior to entering the feedlot, most animal values after entering the feedlot and through sale were fairly similar. While the 2018 group experienced a severe death loss comparable to those observed for the heifers, the cattle spent fewer days in the feedlot to incur a lower cost and received a higher average carcass price due to slightly better yield and quality grades. These factors contributed a higher net return upon sale.

Table 4.8. Performance and financial data for heifers sent to the feedlot and sold on a carcass weight basis in 2017 and 2018

	Days in Precon	Number of days in Feedlot	Carcass Weight	Yield Grade	Quality Grade	Total Feed lot Cost	Carcass Price	Gross Revenue from Feedlot	Total Cost through Feedlot	Returns after feedlot
2017	45	259	798.89	2.23 [b]	Choice	565.69[b]	188.05[a]	1501.28[a]	1249.89[b]	275.49[a]
2018	45	264	774.12	3.22 [a]	Choice	673.37[a]	174.67[b]	1351.57[b]	1274.13[a]	14.58[b]
MSE			9706.03	1.07		0.00	43.24	32117.85	4.71	68270.49

[10]

Table 4.9. Performance and financial data for sent to the feedlot and sold on a carcass weight basis in 2017 and 2018

	2017	2018	MSE
Average Weaning Weight	445.03[b]	502.43[a]	4094.69
Estimated Weaning Sale Price	109.18[b]	134.81[a]	78.86
Estimated Cost at Weaning	577.86[b]	588.44[a]	16.05
Estimated Returns at Weaning	-79.07[b]	121.93[a]	5795.38
Days in Precon	45	45	
Weight after Precon	490.00[b]	527.12[a]	4354.59
Weight Gain in Precon	44.97	59.26	32355.86
ADG Precon	1.00	1.32	15.98
Estimated Precon Sale price	109.82[b]	133.44[a]	74.27
Estimated Cost after Precon	645.05[b]	654.89[a]	17.18
Returns at Precon	-99.22[b]	62.87[a]	4947.48
Weight entering Feedlot	490.00[b]	527.12[a]	4354.59
Number of days in Feedlot	277.00[a]	257.77[b]	111.96
Quality Grades	Choice	Choice	
Total Feedlot Cost	661.31[a]	631.15[b]	359.67

(table cont'd.)

[10] [a-b] letters in each column with different letters are different (P<0.05).

Carcass Price	172.86[b]	183.38[a]	193.79
Gross Revenue Feedlot	1580.34[bc]	1651.94[b]	40817.45
Total Cost Through Market	1349.56[a]	1317.96[b]	247.45
Returns after Market	241.13[b]	374.37[a]	43768.80

[11]

[11] [a-b] letters in each column with different letters are different (P<0.05).

4.8. Video Heifers 2017-2018

Table 4.10 shows the results of comparisons between the two groups of cattle sold through video auctions. While there are significant differences in most measurements, these two groups of heifers in terms of weight and value were quite similar. The major difference was a lower per pound value on the heavier weight heifers of 2018, leading to overall slightly lower returns after the sale.

Table 4.10. Performance and financial data for heifers sold via video auctions in 2017 and 2018

	2017	2018	MSE
Average Weaning Weight	512.25[b]	557.78[a]	1937.20
Days in Precon	48	58	
Weight after Precon	543.22[b]	569.75[a]	1922.22
Weight Gain in Precon	30.97[a]	11.96[b]	986.36
ADG Precon	0.69[a]	0.27[b]	0.49
Precon Sale price	145.00[a]	137.00[b]	1.18
Estimated Cost after Precon	613.95[b]	614.74[a]	1.33
Net Sale Value	773.80[a]	751.32[b]	28.96
Total Cost Through Market	613.95[b]	614.74[a]	0.00
Returns after Market	159.85[a]	136.58[b]	28.96

[12]

4.9. Average Returns by Feeder Grade

Table 4.11 shows average returns by feeder grade regardless of sex, marketing outlet or year. Differences were present between each frame score, but not among each combined frame and muscling score. Larger framed animals were more profitable although higher muscling scores within the same frame size group were not always more profitable. This could be due to the subjectivity of assigned scores, or a small

[12] [a-b] means in each row with different letters are different (P<0.05).

number of individuals with specific scores and higher profitability inflating the average return value.

Table 4.11. Average returns by feeder grade

Feeder Grade	Returns
L3	$571.49[a]
L1	$393.30[b]
L2	$390.64[b]
M3	$260.76[bc]
M1	$251.22[c]
M2	$245.54[c]
S2	-$103.03[c]
S3	-$113.53[c]

[13]

4.10. Feedlot Returns Adjusted for Normal Death Loss

Table 4.12 shows returns adjusted for assuming a normal average death loss of 2% for each group. These means were not statistically analyzed, and this calculation adjusted returns for an assumed average death loss of 2% in each group. The difference did not impact average returns enough to alter the ranking of profitability of any of the groups.

Table 4.12. Returns adjusted for normal death loss 2% for steers and heifers sold on carcass or live basis from the feedlot

	2017 Grid Heifers	2017 Grid Steers	2017 Live Steers	2018 Grid Heifers	2018 Grid Steers
Death Loss	3%	5%	4%	13%	10%
Returns	275.49	241.13	644.04	14.58	374.37
Adjusted Returns	278.24	248.36	656.92	16.18	404.32

4.11. Sale Method Regardless of Year or Sex

Table 4.13 shows results of a direct comparison of sale methods not accounting for year or sex. Returns after marketing for this analysis showed a difference ($p<0.05$)

[13] [a-c] means different superscript are different ($p<0.05$)

for each of the groups with the exception of the two groups sold through conventional auction. Retained ownership cattle sold on a live weight basis still had the highest returns, but the prices received for those cattle were the result of a number of phenomena occurring at one time and additionally all the animals in this group were steers. The next highest returns came from the retained ownership groups encompassing both sexes and multiple years followed by the animals sold through video auctions, comprised entirely of heifers over the same years. Although weaning weights were significantly different for most groups, they were not different for the carcass and group auction animals; however, the most profitable groups had substantially higher weight gains during the preconditioning period. This is notable since growth and weight gain are the most important basic factors for profitability in feeder calf markets.

Table 4.13. Sale method regardless of year and sex

	Grid	Group	Individual	Live	Video	MSE
Average Weaning Weight	469.56[c]	444.70[c]	371.31[d]	582.60[a]	531.35[b]	4373.34
Estimated Weaning Sale Price	115.63[a]			107.10[b]		251.44
Estimated Cost at Weaning	581.12[b]			584.06[a]		39.88
Estimated Returns at Weaning	-17.15[b]			38.82[a]		14395.92
Days in Precon	45	46	46	45	52.19	
Weight after Precon	509.14[c]	453.45[d]	391.54[e]	655.05[a]	554.35[b]	3946.31
Weight Gain in Precon	57.89[ab]	10.82[b]	20.23[b]	72.46[a]	23.00[b]	14936.27
ADG Precon	1.29[ab]	0.24[b]	0.45[b]	1.61[a]	0.51[b]	7.38
Estimated Precon Sale price	115.62[b]	138.01[a]	132.85[a]	104.06[c]	141.65[a]	153.83
Estimated Cost after Precon	648.33[b]	613.70[c]	613.70[c]	652.76[a]	614.28[c]	25.47
Returns at Precon	-44.72[c]	-30.71[c]	-122.64[d]	32.70[b]	170.41[a]	8800.33
Net Sale Value		582.99[b]	491.06[c]		764.37[a]	1262.26
Weight entering Feedlot	509.14[b]			655.05[a]		4958.51

(table cont'd.)

	Grid	Group	Individual	Live	Video	MSE
Number of days in Feedlot	263.08[a]			209.80[d]		96.62
Carcass Weight	856.83[b]			884.58[a]		10558.50
Yield Grade	2.97[a]			2.11[b]		0.98
Quality Grades	Choice			Choice		
Total Feedlot Cost	629.35[a]			524.59[b]		1261.52
Carcass Price	180.83[b]			203.46[a]		151.64
Gross Revenue Feedlot	1548.48[b]			1848.67[a]		42151.81
Total Cost Through Market	1297.66[a]	613.70[c]	613.70[c]	1212.06[b]	614.28[c]	703.54
Returns after Market	239.81[b]	-30.71[d]	-122.64[d]	644.04[a]	150.09[c]	36335.16

[14]

[14] [a-e] means in each row with different letters are different (P<0.05)

Chapter 5. Summary and Conclusions

5.1. Summary

Five-hundred and sixty-one weaned calves from LSU AgCenter Central Station, Hill Farm Research Station, and Louisiana cattle producers were preconditioned and utilized in various marketing outlets including retained ownership, video auctions, group sales, and conventional auction. There were 395 animals sent to feedlots for retained ownership 234 in 2016 and 155 in 2017.A total of 124 heifers were selected for video auctions with 72 sold in 2017 and 52 in 2018. 42 Heifers were sold in traditional auction outlets with 14 sold as single animal lots and 28 sold at a different sale barn in small groups. Input costs of raising the animal to weaning, preconditioning, and all costs associated with each marketing outlet were subtracted from final returns by marketing outlet in order to determine which marketing outlets would be the most profitable.

Retained ownership animals were the most profitable average groups despite higher costs and longer times for the animals to reach market. Video auctions groups were also profitable, and even more profitable than the higher cost feedlot groups. Conventional auction groups had the lowest profitability, with individually sold animals being the lowest overall. There are limitations to the assumptions we can make from these results due to the relatively small number of animals in each group, distribution of animal weights and sexes into each group, and limited number of years over which the study was conducted.

5.2. Conclusions

The various marketing strategies used, and the analyses conducted in this project supported existing theories about the marketing outlets that are usually the most

profitable for beef cattle producers. Conventional auction at the time of weaning is a necessary outlet for many cattlemen, especially those with smaller herds or who do not have the land or labor to develop animals. Returns for conventional auction sales are typically lower when all the costs of raising a calf to weaning are accounted, but the producer does not incur any extra expenses besides local shipping to get the cattle to market. Higher weaning weight animals are more likely to be profitable in this outlet, but these animals can also be utilized just as effectively in other markets.

Retained ownership was found repeatedly to be one of the most profitable marketing channels, assuming producers have a truckload size group of cattle that remain healthy, and cost of gains does not exceed market price at the time cattle are marketed. Unless there is a major disruption or market fluctuation of grain prices, this is unlikely to be an issue. Preconditioning is not necessary for this outlet, but producers will almost certainly profit from the immune strengthening benefits that it provides to cattle. Cattle sold on a live weight basis will incur less risk, assuming the producer is not confident in the genetics of the animals, but grid basis sales offer an opportunity for increased profits based on carcass traits since knowing carcass traits can assist in genetic improvement. The added expense of preconditioning and transporting cattle across the country combined with the lack of payment for calves at the time of weaning means that retained ownership as a whole is not viable for those producers who cannot afford stay in operation without cash flow with the funds from the calf crop sale at weaning.

Video auctions may be a good compromise outlet that will allow producers to maximize their returns without having to wait for payment on cattle to be finished in the

feedlot. Again, this assumes that the producer has a fairly large uniform group of cattle to sell, but the average animal values and returns are consistently higher than conventional auctions. The cost of preconditioning should be mitigated by higher prices for cattle with health certified programs and the producer is not responsible for any shipping expenses.

5.3. Recommendations

More research on this topic with more consistent group sizes of uniform animals for each market would certainly help understand the true values of various outlets. Additionally, conducting this study over a period of years would help lessen the impact of market fluctuations and provide a more complete view of returns in these marketing options. Ideally, two uniform groups of each sex could be sent to each marketing avenue over a period of years with one control group of each sex not being preconditioned to give more accurate and meaningful comparisons. This would require a huge number of nearly identical animals when accounting for lot size and uniformity and would not account for what could be done with the cattle that didn’t meet the specific requirements of these marketing groups. Cattle producers in Louisiana will need to study their herds and resources in order to decide what marketing outlet will be the best fit for their operations.

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VITA

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